**NEWLY RECOVERED MICRODATA ON U.S. MANUFACTURING PLANTS FROM
THE 1950S AND 1960S:**

SOME EARLY GLIMPSES

by

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Abstract

Longitudinally-linked microdata on U.S. manufacturing plants are currently available to researchers for 1963, 1967, and 1972-2009. In this paper, we provide a first look at recently recovered manufacturing microdata files from the 1950s and 1960s. We describe their origins and background, discuss their contents, and begin to explore their sample coverage. We also begin to examine whether the available establishment identifier(s) allow record linking. Our preliminary analyses suggest that longitudinally-linked Annual Survey of Manufactures microdata from the mid-1950s through the present – containing 16 years of additional data – appears possible though challenging. While a great deal of work remains, we see tremendous value in extending the manufacturing microdata series back into time. With these data, new lines of research become possible and many others can be revisited.

* Various parts of this narrative have been presented in the past year at the Federal Reserve Board of Governors and the USDA's Economic Research Service, at sessions at the Comparative Analysis of Enterprise Data (CAED) conference and the RDC Annual Conference, and as part of a webinar broadcast by the Association of Public Data Users. We thank Mark Mildorf and Jason Chancellor for help converting the recovered data into SAS datasets, and Matthew Ashford, Joshua Coates, Henry Cross, and Justin Ladner for valuable research assistance. Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau. All results have been reviewed to ensure that no confidential information is disclosed.

1. Introduction

Microdata on U.S. manufacturing plants have been available on a restricted basis through the U.S. Census Bureau and its Center for Economic Studies (CES) for nearly three decades.¹ These research files currently contain data on all establishments surveyed in the Annual Survey of Manufactures (1963, 1967, and 1972 to the present) and the much larger Census of Manufactures (1963, 1967, and every 5 years thereafter).² Establishment identifiers allow these data to be linked to data from other manufacturing surveys collected by the Census Bureau. In addition, these identifiers have been made longitudinally-consistent, allowing for rich analyses of plant entry, exit, growth, and change. A vast array of economic research can be and has been done using these data.

A significant expansion of these already-valuable data now seems possible. In the last few years, CES unearthed large amounts of “new” manufacturing microdata from the Annual Survey of Manufactures (ASM) and Census of Manufactures (CM) of the 1950s and 1960s. In particular, we have recently uncovered and come to possess:

- Electronic files containing plant-level data from the individual ASMs of 1953-1964 and 1966-1971 (and sometimes multiple versions of a year’s data).
- Electronic files created in the early-1960s containing longitudinally-linked, plant-level ASM data for 25 select 4-digit SIC industries for 1954-1961.
- Several hundred rolls of 16 mm microfilm containing images of (perhaps) all the completed survey forms from the 1954-1958 ASMs (a single “shuttle form”) and the 1958 Census of Manufactures.

¹ Data are available to qualified researchers with approved projects through the Census Bureau’s secure Research Data Center network. For more information, see <http://www.census.gov/ces/rdcresearch/index.html>.

² Note that Annual Survey of Manufactures microdata are included within the Census of Manufactures microdata in those years.

- Research datasets created decades ago by and for economic researchers affiliated with the Census Bureau, including Nancy and Richard Ruggles.

Figure 1 diagrams some of these newly uncovered ASM and CM microdata, and their relation to the ASM and CM microdata that are currently available at CES.

The electronic files were stored on tapes readable only by an old, archaic, and rather frail Unisys Clearpath IX 4400 mainframe that was a descendant of some of the earliest mainframes ever in existence.³ Indeed, some of the oldest data here were tabulated on a UNIVAC, of which the Census Bureau had two.⁴ Hundreds of person-hours were spent poring through old paper records of “data storage action requests” (DSAR) — an effort that revealed thousands of tapes worth of microdata that were eventually recovered, before the Unisys mainframe was decommissioned in 2010. Appendix A attempts to summarize the business microdata that were recovered.⁵ These can be classified into at least a few different types: data from surveys that are entirely new to CES; additional years of data from surveys that CES already had; and additional data items from surveys and years that CES already possessed.⁶ While much interesting historic microdata on manufacturers were recovered, including data on auxiliary establishments, CM special inquiries, class of customer, fixed base difference, industrial water use, and so forth, here we will focus only on the additional years of the ASM.

The challenges in moving these data to a modern computing platform were (and are) many. Among them, much of the data were stored in an arcane, proprietary file format (CENIO), which

³ For another discussion of the historic data recovery effort, see Atrostic et al. (2010).

⁴ In 1951, the Census Bureau purchased the very first UNIVAC computer ever produced (literally). The UNIVAC, the first electronic computer for commercial/civilian purposes, was designed by Eckert-Mauchly Computer Corporation, which was acquired by Remington Rand, which in turn was later acquired by the Sperry Corporation, which eventually merged with the Burroughs Corporation to form the Unisys Corporation. The decommissioning of this last Unisys Clearpath IX 4400 (“D machine”) in the spring of 2010 ended an extraordinary 59-year chain of mainframe computing at the Census Bureau.

⁵ A summary of recovered household microdata is available upon request.

⁶ For the list of surveys and years that CES currently has and makes available, see <http://www.census.gov/ces/dataproducts/>.

meant files could not simply be copied to another computer system. Further, the data within the files were completely unstructured, requiring a bit-by-bit, byte-by-byte, word-by-word record layout (on paper) to make sense of the data. In cases where a record layout no longer exists, the only hope is if a similar microdata file exists that might shed light on the contents and layout, and/or if the published aggregate data can somehow aid in reverse-engineering a record layout. Adding to the challenge, the vast majority of data employed now-esoteric, non-ASCII character sets, including FIELDATA, Excess-3 (XS3), Binary integer, and EBCDIC.⁷ For technical reasons, and to speed recovery, the data were read, converted to an ASCII equivalent, and written to a text file on the Unisys Clearpath, using two different assumptions: (1) the original data was all FIELDATA, and (2) the original data was all XS3. If there was a mix of character sets present within a file, which was not uncommon,⁸ then the resulting “gibberish” must be (re)converted to ASCII using the implied character mapping.⁹ It is worth noting that the knowledge and manpower necessary to overcome these various technical challenges, and to operate, maintain, and repair the Unisys Clearpath was incredibly scarce. While the vast majority of recovered data files are still in a rough state (i.e., text files in ASCII-FIELDATA and ASCII-XS3 format), and will likely remain so until demanded, the ASM files discussed in this paper have been converted to SAS datasets.¹⁰

In this paper, we begin to describe these newly uncovered ASM microdata. As Figure 1 suggests, there are at least five distinct pockets of “new” data, separated by both time and source, and we organize our discussion accordingly. For each of these different groups, we describe its

⁷ Overall, most data was in FIELDATA, which was developed by the U.S. Army Signal Corps in the 1950s.

⁸ For example, some of the data discussed in this paper came from files that were mix of XS3 and Binary integer.

⁹ In cases where a record layout no longer exists – explaining variables, their positions, their lengths, and the character set(s) employed – we also have a Unisys-created text file displaying the first 100 records of a data file, employing 5 separate assumptions of character sets (FIELDATA, XS3, ASCII, Octal, and Decimal numeric). This can help us infer the proper character set and variable position and length.

¹⁰ Opportunities exist to develop and use all the newly recovered microdata listed in Appendix A. For more information, contact the authors or ces.data.recovery.list@census.gov.

origins and background (to the extent we can), discuss the set of variables contained therein, and begin to explore the sample coverage of each of these files, comparing establishment counts and aggregations of critical variables to those appearing in the ASM publications from the period. We also begin to examine the critical issue of whether the available establishment identifier(s) in these files allow both cross-sectional and longitudinal linking of records, including the linking of these historic ASM data to the “modern” longitudinally-linked manufacturing data that CES has long made available to researchers (i.e., those covering 1963, 1967, and 1972-present).

Our analyses show that longitudinally-linked microdata on manufactures, covering 1954 to the present, appear possible though very challenging. With the exception of a few years with fewer cases than we would expect (particularly 1953 and perhaps 1954), and 1965, for which we have no data at all, it appears possible that we have data on all ASM establishments over this period. The biggest challenge, no doubt, will be in constructing longitudinal links from these ASM files to the existing longitudinally-linked microdata – in particular, the CMs of 1963, 1967, and 1972. The naïvest of matching algorithms yields match rates of 75% to 96% for the ASM files in the 1960s and early 1970s. On an employment-weighted basis, these rates are 86% or better. Match rates decline, however, monotonically, as the time to the 1963 CM increases – falling to just 48% in 1954 (56% on a weighted basis).¹¹ These match rates can be improved upon through the use of multiple establishment identifiers and by other means (such as characteristics matching), but the task will prove challenging. Adding to the challenge is the tangle of (undocumented) files from 1954-1964. There are also the sobering (if sometimes vague) assessments offered by commentators from decades ago that led to the abandonment of these files in the late-1960s along with all efforts to longitudinally link them — assessments that

¹¹ For researchers interested in 25 select, largely capital-intensive industries, ASM data from 1954-1961 can be linked to the “modern” years at an 83% rate (93% on a weighted basis), and at a 100% rate for some industries.

still held currency over a decade later when these files were explicitly ignored in favor of the more modern ASM and CM files, in an effort that was the basis for the longitudinally-linked manufacturing microdata we have today.

As will become obvious, a tremendous amount of work remains. However, we see great value in extending the manufacturing microdata series back into time. For the macroeconomists among us, these additional data contain a few more business cycles than currently available. These data would also allow the extension of gross job flows (job creation and destruction) series back into time.¹² The 1950s and 1960s, in many ways, represents the “heyday” of U.S. manufacturing — before significant foreign competition, before the 1970s energy crisis, before modern environmental regulation, and so forth. With these data, new lines of research become possible, and many others can be revisited.

2. The individual ASMs of 1966-1972

The data in this group were recovered from the Unisys Clearpath by Alfred Nucci, then a CES staff member, in May 2006.^{13,14} Nucci recovered these files from the Unisys Clearpath in a manner different than that described in the previous section. He instead wrote COBOL programs that explicitly coded the record layout. These programs were executed on the Unisys and output as ASCII files. In November 2009 and January 2010 we pulled these same files using the alternative method described above – a more robust method – as insurance against possible

¹² The gross job flows data, described in Foster, Haltiwanger, and Kim (2006), can be found on John Haltiwanger’s website: <http://econweb.umd.edu/~haltiwan/>. These data currently cover 1972-1998.

¹³ Nucci retired just a few weeks later, so we were never able to discuss with him this work. All we have are the programs and datasets he left behind.

¹⁴ CES already holds the 1967 and 1972 ASM data as part of the CM files from those years. Comparison of the recovered files to the existing CM files for these years offer opportunities for better understanding the recovered files as a whole.

errors in these COBOL programs, or some other mishap.¹⁵ We have not yet worked with these alternate files or compared them to Nucci's.

By examining Nucci's programs, we know the tapes he pulled the data from and the names of the respective data files. We have since been able to identify most (but not yet all) of the DSARs that describe these files. This information is summarized in Table 1.¹⁶ At this point, our biggest concern is that the 1970 file may be missing 4,132 records that carried over onto a second tape. We are fairly confident that our data recovery efforts in 2009 captured these additional records, but we have not yet incorporated these additional observations. We are also a bit concerned (based solely on our observation of the names of the files in comparison to others) that the 1966 and 1971 files may not contain the *final* establishment-level data for those years.

The recovered ASM files contain much of the information collected on the ASM forms of the time. (For facsimiles of surveys forms from this period, one from each of the two ASM waves during this time (1965-68 and 1969-72), see Appendixes B and C.) For each year (1966-1972), the data include numerous output measures, including total value of shipments, value added, various inventories (total, finished products, work-in-progress, materials), and details at the product level, including value shipped and quantity shipped. The data also include employment measures, including total employment, production workers (by quarter), and man-hours of production workers (by quarter). In addition to payroll measures, including total payroll

¹⁵ We'll note that none of the relevant data storage action requests (DSARs) here contained a record layout. Nucci instead assumed/used an ASM record layout from the 1967 CM (see DSAR 79-112). For the most part, this seems to have been a decent assumption. However, we have identified some variables that are clearly not what the record layout would suggest – such as the issue with Serial_no, Type_3, and Rec_no, as noted below, and EIN and OLDID with no values.

¹⁶ Besides those listed in this table, we recovered data from at least four other DSARs related to the ASMs from this period that also appear to be worth exploring. This includes DSAR 78-143 containing “1965 ASM - Sample Selection: 1965 ASM Sample Run 32 OUT 1 / UNIVLISTOUT and SAMPLLISTOUT”; 78-145 containing “1970 ASM - Sample Selection: Sampled Companies w/ Revised Weights”; 78-145 containing “1970 ASM - Sample Selection: Sampled Companies w/ Revised Weights”; and 78-149 containing “1971 ASM: Final Name and Address File”.

and the salaries and wages of production and non-production workers, these data also include supplemental labor costs – both legally-required and voluntary. Data on other production costs include the costs of materials and supplies, fuels, electricity, contract work, and so forth. The data also include details on capital expenditures (total, equipment, structures, new, and used), gross book value of capital assets (total, equipment, structure), rental payments (equipment, structures), and capital retirements. Kilowatt-hours of electricity purchased, generated, and sold/transferred are also here. Other notable variables include 4-digit SIC industry code, geographic codes, sample weight, and various identification numbers (including ID, Tab number, and PPN).¹⁷ The contents of these datasets, and all those discussed in this paper, are summarized in Table 2. Note that, with the exception of a number of key variables, we have not verified that all variables are filled with non-missing values in all years, let alone sensible values. This is a particular concern here since a surrogate record layout was used.

Table 3 shows the number of observations, the number of observations with positive payroll and employment, and the number of observations suggested by each year's ASM publications.¹⁸ In all years, the number of observations in these files exceed the numbers mentioned by the respective ASM publications. And the number of observations with positive payroll and employment also exceeds the numbers mentioned by the respective ASM publications in all years but 1970 and 1971.¹⁹ We previously noted that these Nucci files may be

¹⁷ There appears to be at least one other identification number that currently (and erroneously) spans the variables Serial_no, Type_3, and Rec_no. It is a 10-digit ID-like number, but we do not know what it is exactly (because we do not have the appropriate record layout). This identification number's position is precisely where these other three variables are in the 1967 CM record layout used and assumed by Nucci.

¹⁸ Here, observations that were exact duplicates across all variables have been removed from these datasets, while ID-year duplicates with different data in any variables are retained. Also, observations with SIC industry codes outside of 2000-3999 have also been removed.

¹⁹ The 1972 Census of Manufactures publication makes no mention of how many ASM cases there were in that year, though we might expect it to be between “about 65,000” and “about 70,000”, which are the numbers mentioned in the 1971 and 1973 ASM publication, respectively. We will noted that close to 70,000 observations are flagged as ASM cases in the 1972 CM file maintained by CES.

missing 4,132 records in 1970 that were subsequently recovered but not yet incorporated. We also noted a potential concern about the 1971 file. Further work will be needed to “prove in” these data.

We undertake a few preliminary longitudinal-linking exercises with these files. In particular, we attempt to longitudinally link adjacent years of these files together, as well as link these files to the longitudinally-linked manufacturing microdata that currently exists at CES. While there are a few establishment identifiers in these particular ASM files, for this initial exercise we will simply use the variable ID, a ten-digit number that uniquely identifies an establishment and has embedded in it a firm identifier common to all establishments within that firm (as it is in the “modern” files as well). Table 4 shows match rates on both an unweighted and employment-weighted basis.

In terms of linking adjacent years of these ASMs, a number of unweighted match rates are in the 80, 90, and 100 percent range, and the weighted match rates are even higher (not surprisingly). Two major exceptions here are the links between 1969 & 1970, and 1971 & 1972. It is not obvious to us at this point why this should be the case.

To illustrate the importance of also utilizing some of the other establishment identifiers present, we took previously unmatched cases (through ID matching) and attempted to match by the 7-digit Tab number (TN) instead. This improved overall match rates by as much as 13 percentage points.²⁰ We did not attempt any additional matching beyond this.

Table 4 also contains match rates of these ASM files to the existing longitudinally-linked microdata – in particular, the CMs of 1963, 1967, and 1972. We see that, not surprisingly, the 1966 ASM matches better to the 1967 CM (84%) than to the 1963 CM. Also not surprising, the

²⁰ In particular, the match rate between 1966 & 1967, 1967 & 1968, 1968 & 1969, 1969 & 1970, 1970 & 1971, and 1971 & 1972 improved by about 9, 5, 0, 5, 5, and 13 percentage points, respectively.

1967 ASM matches better to the 1967 CM (91%) than to the 1963 CM or 1972 CM. The 1968 and 1969 ASMs match better to the 1967 CM (81%) than to the 1972 CM, while the 1970 and 1971 ASM match better to the 1972 CM (77% and 91%) than the 1967 CM. For reasons we don't yet understand, the 1972 ASM matches better to the 1967 CM (84%) than the 1972 CM (52%). This is not a large concern for us since we already have the universe of 1972 establishments in the CM. On an employment-weighted basis, the maximum match rates achieved are 91%, 97%, 91%, 88%, 86%, and 96%, for 1966-1971, respectively. We'll note that these matches do not appear to be spurious — matched cases agree on county and 4-digit SIC in a very large proportion of cases.

As was the case earlier, the use of some of the other establishment identifiers to match unmatched cases proved successful. In particular, the use of TN raised the match to the 1963 CM, for the 1966 and 1967 ASMs, to 86% and 72%, respectively, on an unweighted basis, and 96% and 92% on a weighted basis. Meanwhile, the use of EIN (which is in the final nine digits of the ID for single-unit establishment/firms) improved the match rates of all the ASMs to the 1967 CM — upwards of 2.3 percentage points in the cases of the 1966 and 1972 ASMs. Likewise, the use of EIN improved the match rates of all the ASMs to the 1972 CM, in the range of 1 to 3 percentage points. The other identification number noted above (that spans the variables `Serial_no`, `Type_3`, and `Rec_no`) also appears to play a useful role, particularly in matching the 1966 ASM to the 1963 CM. A more careful study and analyses of identifier matching will eventually need to be done.

In summary, using just simple ID-matching, between these ASM files and the existing longitudinally-linked microdata, we achieve an unweighted match rate ranging from 77% to 91%, with a weighted match rate ranging from 86% to 97% (the nadir being 1970 in both

instances). Of course a match rate of 100% is unrealistic here, since a non-trivial number of establishments die over time. Nevertheless, match rates can no doubt be improved by using some of the other establishment identifiers available (as we have already demonstrated). Broken links can also potentially be restored through “characteristics matching” which might, for example, rely on 4-digit SIC industry, county, and perhaps size class.

3. The individual ASMs of 1954-1964 (the “Industrial Time Series” files)

3.1. Background

The data in this group were recovered from the Unisys Clearpath in October 2009. The source of these data were the 38 unique files/tapes associated with Data Storage Action Request 79-089, of which only 37 were successfully recovered.^{21,22} The title given to these data on this DSAR (and its predecessors) was the “Industrial Time Series” or ITS,²³ and the record layouts contained therein strongly suggest ASM data covering 1954-1964. Beyond that, the DSARs offer little clue of the story behind these files.

The earliest and most detailed account of this project that we have been able to (easily) find is a paper by Maxwell Conklin, then Chief of the Census Bureau’s Industry Division, titled “Time Series for Individual Plants from the Annual Survey of Manufactures and Related Data” presented at a joint session of the American Economic Association and the American Statistical

²¹ There are 76 files listed in DSAR 79-089. Of these, 38 files (half of the files) were known duplicates and recovery was not attempted unless the first copy of the file could not be recovered. It was standard practice during this period to make and store two copies of everything.

²² This DSAR was executed in March 1979, after hundreds of UNISERVO III-A tapes associated with DSAR 68-130, 69-068, 69-069, 69-070, 69-071, 69-091, 69-092, 69-093, 69-095 and 69-096 (dating from the winter of 1968-69) were copied to UNISERVO VIII-C 9 track tapes. It is these early DSARs that contain the record layouts needed to read the data files and convert them to ASCII. The DSAR for 68-130 has not been found.

²³ For better or worse, this is what we have come to call these files, though it appears that these data had no proper name at the time, at least not one that was used consistently. Old working papers and other documents tended to refer to these data as the *time series file*, the *time series project*, or similar (e.g., Jordan 1965, Krishna 1967, Klotz 1970, Kallek 1982). Only in these DSARs, and in a Request for Records Disposition Authority (SF-115) filed with the National Archives in 1982, are these data ever called the ITS.

Association on December 30, 1964. Conklin describes a project to construct longitudinally linked data on manufacturing establishments and the hopes underlying this effort – in particular, that such data would help in the development of “new and improved measures that would throw light on the forces changing the structural characteristics of industry.” Besides data from multiple ASMs, these files would also contain additional data items available only in the CMs (e.g., exports, installed horsepower) or in special supplemental surveys, as well as derived items (e.g., average hourly earnings) and data on the parent company (e.g., R&D expenditures, integration/diversification, profitability, concentration). Conklin states that with these data, “the dynamics of a manufacturing plant can be introduced to the computer record as a basis for its classification and analysis”, and he lists a number of specific examples. In addition, he notes the potential “for testing and developing models dealing with the components of growth or decline, investment functions, economies of scale, elements of changes in productivity, and so forth.”

In his paper, Conklin presents a number of experimental tables and charts, and describes some eight other projects that were underway or under consideration.²⁴ None use the full ASM of all industries. Instead, they use a 25-industry prototype of these data covering 1954-1961 (and later 1963) with around 1,800 establishments. (These data will be the subject of the next section.) The challenges in bringing together multiple years of the full ASM were no doubt great, particularly with the computer technology of the time. Conklin speaks to some “serious obstacles to the achievement of a completely or even moderately satisfactory basic file.” Among them are omissions and data error. Even when these were discovered during processing, because

²⁴ The other projects include ones that examine investment functions; potential output in relation to actual shipments; changing patterns in the use of materials (by plant age); demand for fixed investment; productivity and disemployment; factors affecting wage changes; optimal scale, merger, and integration; economies of scale and technical change in manufacturing; and efficiency of new plants as compared with older plants in the same industry. To date, we have only found documents on one or maybe two of these (Jordan 1965, Klotz 1970). Kallek (1975) refers to a Bureau of Labor Statistics “methodological study to explore whether plants with high productivity levels could serve as a guide to projecting future productivity increases of an industry.” She may be referring to Klotz (1970), but it is not clear.

“the cost of correcting computer tapes is relatively great ... in a good many instances these corrections were not carried back to the basic tapes or were incorrectly recorded. Another and more serious problem is that with mergers, changes in corporate structure, company name, etc., the identification number of plants has changed over the years with the result that frequently it is not mechanically feasible to bring the records together in the computer. All of these limitations are more pronounced for earlier years than for the period since 1958.”

Conklin does mention that “plans for the immediate future involve consolidating the records for large establishments which have changed identification numbers and correcting large data errors in the tapes. The task of correcting records and making other modifications will probably take another year or two.” Elsewhere he states that “several years of effort have already been expended on the project and the end is not yet in sight.”²⁵ Recounting the endeavor nearly 20 years later, Conklin (1982) remarks:

On the face of it, it would appear feasible to carry corrections to the micro records as originally taped. There were many (maybe too many) ways that plants could be matched. In addition to industry and geographic codes, Social Security employer identification numbers – alpha numeric company numbers and permanent plant numbers – were on all plant records. After the mid-1950’s, nearly all Annual Survey records were collected annually for the previous year as well as for the current year on the same report form. This overlap system of reporting increased the efficiency of the sample design by yielding estimates by differencing from the previous year rather than by directly estimating tables. It was assumed that the overlap would be very helpful in matching plants. The creation of a clean micro file was by its nature not a primary Bureau goal, and as a secondary objective, it simply did not work out well. This experience was frustrating 20 years ago, 15 years ago, and apparently has been since then.

Kallek (1975), then Associate Director for Economic Fields at the Census Bureau, discusses the usefulness of business microdata for economic research and the reasons why the development of such data (and analyses) had so far faltered. She essentially reiterates the challenges mentioned by Conklin (1964), before concluding:

The major lesson learned from the 1960’s time-series effort is that it is almost impossible to reconstruct an historical file of individual establishment records. The tracing of identification numbers for individual establishments and the *ex post facto*

²⁵ Willis Jordan, however, writing in 1965, suggested that the project was only underway “for about 2 years.”

correction of data fields pose processing problems which are almost impossible to overcome.

If the Bureau is to provide the ability for microdata analysis, the concept must be built into its operating system, and research efforts must be undertaken here at the Bureau which will permit optimum manipulation of the data.

In the proceedings to a January 1982 conference discussing a new effort to longitudinally-link data from the ASMs and CMs – the effort that led to the longitudinal manufacturing microdata that CES has housed and made available for decades – Kallek offers this account of the ITS project's final days:

In the 1960s, an initial attempt was made to construct a time series file of manufacturing establishments but was aborted in the latter part of the decade because of budget stringencies that occurred at that time. The potential value of this file was discussed at length with data users. So it was with great reluctance that the staff at the [Census] Bureau suspended work on the early project and stored the results in our files without any extensive exploitation of them.

The DSARs mentioned earlier indicate that the data were mothballed in the winter of 1968-69.

Kallek (1982) also offers a detailed discussion of the challenges leading to this project's shutdown in 1968, which we think is well worth transcribing in its entirety:

The early attempts to match the ASM files using the 1954 census as a starting point proved both promising and frustrating. The early match was undertaken based on census identification numbers. While a significant portion of the establishments had retained their identification numbers for several years, many others' identification numbers had been changed. There was really no way of linking such establishments except by laborious search of the records of the mailing directory. In those days, the method of tabulating the ASM required concurrent key punching of two successive years of data appearing on a single shuttle form. Thus, the linkage of ID numbers used in different years was not critical in order to measure year-to-year change. Some of the largest establishments in the ASM were used in various studies in defense planning and had been assigned a permanent plant number to identify them in each ASM, and these helped resolve some of the unmatched records. But the initial match indicated a very large number of cases where identification number had been changed because of ownership changes. Also there were many cases where a company decided to split its reporting into two documents or consolidate data for two establishments onto one document. Where such managerial decisions do not seriously affect the industry and geographic tabulations, the Census Bureau concurs in order to minimize reporting burden. Thus, the early match led to a significant amount of time and effort to research the larger unmatched establishments. This

experience led to the modifications in our processing that placed greater responsibility on the directory to document reasons ID numbers changed and link old and new numbers. It also led us to introduce into our tabulations the concept of a permanent number that would be assigned to an establishment throughout its life in the ASM. This tabulation number became critical not only to the directory controls but to a new method of tabulation and editing.

When several years of data were put side-by-side for establishments which were matched, deficiencies in these data appeared. There were unexplained gaps in data items or imputations where it seemed a report was not received for a specific year. There were indications that the data had been changed in the process of the editing from what was originally reported without an indication in the file as to why the figures had been changed. Quite frequently, the linking of data over time indicated unexplainable changes in level of the data that impaired comparability. The whole process indicated the editing and review process could be tightened up and improved if some of the advantage of the time series review could be introduced. We began to edit the current year's annual survey against as reference tape of previous years' reported data. Under these circumstances, the permanent number of the establishment became even more critical. In the process of reviewing the data in the time series file, we found that it was possible to introduce year-to-year comparability edits that would lead to more consistent data and also to develop the analyses of frequency distributions of various types of operating ratios.

The ASM profited from the early time series work both in its housekeeping operation and in its editing and tabulating techniques. However, through the years, as we plunged deeper and deeper into the development of the file, we found that we had serious problems with managing a file of the magnitude of the time series. We were faced with problems of how to increase the file each successive year and introduce retroactive corrections. We also faced the problems associated with modifications in the annual survey processing and sample control that took place during census years and when new samples were selected after the census. In short, as a result of our need to treat the annual survey and the data for establishments as a continuum, we learned to better handle the annual survey and our census directory operations. Thus, we felt keenly the necessity to discontinue further work on the file in 1968 because of budget restrictions. For all its deficiencies and additional cleanup work needed in the file, we felt we were nearing the point where systematic experimentation could be carried out. We were also beginning to cope with the problems associated with the successive updating of the file.

There is an old proverb that states, "The mountain was in labor and a mouse was born," and to some extent this proverb comes to mind when we think of our experience with the time series file. Inevitably comes the question, "With all of the time, expense, and thought that went into the development of the aborted 1954 to 1964 file, what productive use was made of the file?" Unfortunately, in absolute terms, little; but probably a bit more than many realize.

Kallek then cites Conklin (1964) and Jordan (1965), both of which use the more limited 25-industry ITS prototype, which we describe in the next section. Schaffer (1968), on the other

hand, clearly employs longitudinally-linked data that spans the manufacturing sector.²⁶ That the end date for this analysis is 1957, for a paper published in 1968, may be telling. Finally, Kallek also mentions “experimental studies by Professor Griliches to study scale of operations; by Leonard Weiss to study efficiencies of scale, productivity, and the impact of mergers; and the National Planning Association to study capital output relationships.” We have not (yet) found any of these particular studies.

Kallek (1982) goes on to say:

The file was not exploited to the extent that it should have been, primarily because the Bureau devoted so much effort to its development that it has no resources for developing procedures that would permit it to be routinely accessed without a significant expenditure of staff time to assist the researchers. The amount of review required and the correction of defects and errors were both time consuming and costly. But one of the more important reasons for not exploiting it was that techniques were not available to routinely review the data for disclosures. There was significant concern about whether some of the special mathematical techniques for analysis would disclose data or possibly foreclose the use of data for other studies. Discussions on several occasions were held with individual researchers and with various advisory groups as to how these concerns could be resolved. It was evident that for maximum usefulness, the researcher should have sufficient flexibility to review interim output so that he could modify his research project if he felt that the final required tabulations could not be determined without this type of experimentation. A paper later on in this program deals with the problems of disclosure.

The years have passed all too swiftly as it seems, so it comes as a shock to realize that the last entry of data into the file was for 1964. Consequently, when the possibility of reactivating the time series files with the cooperation of the National Science Foundation and Dr. Ruggles was presented to us, all concerned felt that wisdom demanded that we start anew rather than to try to bring the old file up-to-date. The present project which will be described by Mr. Govoni is forward looking. It looks to developing a time series file beginning with 1972 data and developing the procedures for routinely adding successive years as time goes by. If this file can be brought to fruition and used effectively in analysis, **there may be some value in the future to put the 1954 to 1964 file in a state that it could be joined and linked with the new file. The longer we have to wait, the more obsolete the older tapes become in light of changing computer technology.** [Emphasis added.]

²⁶ Schaffer examines the decreasing share of production workers in total manufacturing employment, using the ASMs of 1954 and 1957. He says very little about the origins of the data. His ultimate sample consisted of just 8,001 establishments.

Of course the data on these tapes came within a few months of being lost forever. It is not clear whether Kallek, who died in 1983, would have imagined that it would be almost 30 years before anyone would attempt to link these old files to the “modern” files of manufacturing microdata.

3.2. *The many ITS files of 1954-1964 ASMs*

It is with this backdrop, and Kallek’s sobering assessment of the state of these files, that we undertake our initial exploration. The first step is to convert the files from their raw format in which they were recovered from the Unisys Clearpath into SAS datasets. To assist us, there is a record layout for all but 2 of the 37 recovered files.²⁷ In particular, there are two record layouts that apply to these files. The first, hereafter called ITS-1, applies to 34 files and is shown in Appendix D. ITS-1 is titled “Industrial Times Series Detail Record” and contains establishment identifier information and ASM data items. The second record layout, which we will call ITS-2, applies only to a single file (with over 750,000 observations) and is shown in Appendix E. The ITS-2 layout is titled “Industrial Time Series - Finder File Prep.” This layout contains just select key variables for each establishment.²⁸ We do not examine the file read in by the ITS-2 layout in this paper, but we note this file could potentially be useful information for linking establishments longitudinally.

Beyond the likely record layout, very little is known *a priori* about the contents of these files.²⁹ Table 5 lists the 34 files that were made into SAS datasets using the ITS-1 layout, the number of observations in each file, and the associated DSAR. We see that the number of

²⁷ We think the information for the remaining two files was in DSAR 68-130, which we have not been able to locate. It is clear that neither of the record layouts we do have are appropriate for this file. More investigation and analysis will be necessary to identify the layout of this file. These two files combined have 937,798 observations.

²⁸ Note the top row of the ITS-2 layout is a “header” record providing column headings for the data below.

²⁹ Moreover, until we start using and proving in the data, we will not know whether using the ITS-1 record layout to read in the data produces reasonable results.

records per file ranges from just a couple of hundred to over a hundred thousand. It is not clear how any of the files, and the records in these files, relate to one another. Table 6 lists each DSAR, the total number of observations in files associated with the DSAR, and the description provided in the DSAR. As one can see, the descriptions of the files are cryptic at best. A detailed exploration of the files will (eventually) be necessary to determine how (if) they fit together.

3.3. A more detailed look at the DSAR 69-068 files

As an initial step of what will likely be a complicated endeavor, we chose a set of files that appears to have the proper number of records. We chose the set of files that correspond to DSAR 69-068, with its 686,279 observations.³⁰ We find that the files include data for 11 years (1954-1964), but also include 47,538 records with year equal to 1911. After some cogitation and careful study, we came to realize that these “1911” records in fact contain data from the MC-D11 form (Census of Manufactures Supplementary Inquiries for 1957).³¹ Outside of this issue, the year range of 1954-1964 is consistent with Kallek’s (1982) description of these files. Govoni (1982), however, writing in the same conference proceedings, mentions that “large portions of the ASM file were successfully matched for the years 1954-1962 ... [but] many potential matches were not resolved.” It is not clear whether “1962” was a typo, or whether Govoni had doubts about the quality of links involving 1963 and 1964.

These files contain nearly all of the information collected on the ASM forms of the time. (For facsimiles of these surveys forms, see Appendixes F, G, and H.) For each year (1954-

³⁰ DSAR 68-091, with 690,989 records, is another promising candidate. According to Table 6, both of these are from “ITS127”, however the description seems to suggest that DSAR 69-068 may includes some corrections, while DSAR 69-091 is “ITS127 Input.”

³¹ A minor change to the ITS-1 record layout (shown in Appendix D) is necessary to read in the MC-D11 records. In particular, the “FLAGS” field at the end of line 1 must be split into three separate fields.

1964), the data include numerous output measures, including total value of shipments, adjusted and unadjusted value added, various inventories (total, finished products, work-in-progress, materials), and details at the product level, including value shipped and (for 1958-1964) quantity shipped. The data also include employment measures, including total employment, production workers (by quarter), and man-hours of production workers (by quarter). In addition to payroll measures, including total payroll and the salaries and wages of production and non-production workers, these data include various other production costs, including the costs of materials and supplies, fuels, electricity, contract work, and so forth. The data also include details on capital expenditures (total, equipment, structures, new, and used) and kilowatt-hours of electricity purchased, generated, and sold/transferred. Other notable time-varying variables include 4-digit SIC industry code, state and county codes, sample weight, and various identification numbers. For years 1963 and 1964, the ASM form was revised to include four additional variables: gross book value of capital assets, rental payments on structures, rental payment on equipment, and capital retirements. Since gross book value of capital is measured at the end of year, the files actually contain values for 1962 as well.³²

In addition to these annual variables, the files contain measures of activity at certain points in time. As noted earlier, data from the 1957 MC-D11 survey is contained in these files. (For a facsimile of this survey form, see Appendix I.) This includes information on depreciable assets in 1957, including the gross book value of capital assets, accumulated depreciation, depreciation, and retirements. Also included are items on employer payments in 1957 for old age and

³² Gross book value of capital assets has positive values in 1962-1964 for 90-99% of establishments. Rental payments on structures has positive values in 1963-1964 for about 40% of establishments. Rental payments on equipment have positive values in 1963-1964 for close to 30% of establishments. Capital retirements have positive values in 1963-1964 (for about 60% of establishments). For reasons we don't quite yet understand, positive values for these variables also exist in 1959. While for capital assets, equipment rental, and retirements, the incidence of positive values is less than 2%, for structure rental it is over 80%. Information in this footnote is based solely on DSAR 69-068.

survivors insurance, unemployment insurance, workmen's compensation premiums, and private pension plans, health plans, life insurance, stock purchase plans, savings plans, and so forth. Survey items also include 1957 expenditures on maintenance and repairs, insurance premiums, rental payments, and tax payments.³³

Table 7 contains the full list of variables and definitions. Variable names were created by us, and are subject to change in the future. The available variables are also summarized in Table 2. Note that, with the exception of a number of key variables, we have not verified that all variables are filled with non-missing values in all years, let alone sensible values.

Setting aside the MC-D11 data, we are left with 638,741 records.³⁴ Table 8 shows the number of observations, the number of observations with positive payroll (SW) and employment (TE), and the number of observations suggested by each year's ASM publications.³⁵ For most years, the number of observations in these files exceed the numbers mentioned by the respective ASM publications. The two exceptions are 1954 (with 39,667) and 1957 (with 47,780). The 1954 CM publication makes no mention of how many ASM cases there were in that year, though we might expect it to be between 52,000 and "about 45,000", which are the numbers mentioned in the 1953 and 1955 ASM publication, respectively. Jordan (1965) states that there are around 45,000 records in 1954 (and 60,000 in 1961). To the extent that the counts do not match those stated in the publications, recall that this is just one set of recovered files. The other sets of files

³³ As noted in U.S. Bureau of the Census (1961): "Form MC-D11, Selected Costs and Assets of Manufacturing Establishments, collected data on some of the cost items which account for the difference between value added as defined in the Census of Manufactures and national income originating in manufacturing. ... The MC-D11 survey for 1957 ... compiled data on several cost items not deducted from value added. These costs amounted to \$15.4 billion in 1957."

³⁴ We'll note that not all MC-D11 ID values can be successfully merged to other ID values in the data. Nearly 98% of MC-D11 ID values can be matched to 1957 ASM ID values. There are just over 1,000 MC-D11 ID values that cannot be matched to 1957 ASM ID values. Several hundred of these can be matched to ID values in other years, but there are over 600 MC-D11 ID values in the DSAR 69-068 data that cannot be matched to any of the ASM ID values from DSAR 69-068.

³⁵ For the purposes of this paper, ID-year duplicates are left in the data; less than 0.3% of observations in the DSAR 69-068 data are ID-year duplicates. Further examination is necessary to determine if the ID-year duplicates in the data contain duplicate information or are actually different establishments.

might have different counts and/or may have establishments not in this file. And the files discussed in Section 5 are yet another source of data covering these same years. Regarding 1954 in particular, the records here can and should be compared to the *prior year* data contained in the 1955 ASM file discussed in Section 5.

As another early check, we attempt to aggregate a few key variables (including payroll, employment, and value of shipments) using the data and sample weights found in these files. For the most part, national totals are in the right ballpark. There are some variables missing in certain years. For example, unadjusted value added and quarterly production worker values are missing for 1954-1958 and 1960-1961.³⁶ Recall that all of these exercises have been done using just observations from DSAR 69-068. Results could be different using data from a different DSAR or combining data from various DSARs.

We also undertake a few preliminary longitudinal-linking exercises with these files. In particular, we attempt to longitudinally link adjacent years of these files together, as well as link these files to the longitudinally-linked manufacturing microdata that currently exists at CES. There are multiple establishment identifier variables here in these files: ID (current year), OLDID (prior year), TN (tab number), and PPN (permanent plant number). All of these variables may provide important information for longitudinally linking establishments.³⁷ However, for this initial exercise we will simply use the variable ID. As in the “modern” files, ID is 10-digit variable that uniquely identifies establishments with an embedded firm identifier

³⁶ Note that it appears that unadjusted value added values are all zero/missing in 1954-1958 and 1960-1961 and adjusted value added values are all zero/missing in 1954-1957. The value added numbers that do exist produce reasonable national numbers suggesting this missing value added data is probably not the result of a file read-in error. However, the possibility of a file read-in error should be investigated. Quarterly production worker values also appear to be zero/missing in 1954-1958 and 1960-1961. Additionally, it is clear that there are problems with a few variables in select years as we see some ridiculously large tabulated values. More investigation will be required to determine the underlying problem(s).

³⁷ We look at how often ID differs from OLDID. In most years, ID differs from OLDID for less than half of one percent of observations. However, in some years the percent of observations for which ID is not equal to OLDID is larger: 1959 (3.6%), 1962 (5.5%), and 1964 (1.8%).

(first 6 characters for a multi-unit firm). Table 9 shows match rates on both an unweighted and employment-weighted basis.

In terms of linking adjacent years of these ASMs, match rates are generally high (most above 90%) with some notable exceptions. The CM year, 1958, has a relatively low match rate to 1957 and 1959. Note, however, that 1958 has many more observations than surrounding years and that more than 90 percent of 1957 and 1959 ASM plants can be matched to 1958. It is possible that in 1958, we have both plants from the 1954-1958 ASM panel and plants from the 1959-1963 ASM panel. There is a similar, but much less pronounced, issue in 1963 – another CM year. We'll note that the matches seen here do not appear to be spurious. Conditional on achieving a match, county and 4-digit SIC industry match rates are generally around 99% (for year pairs that do not entail geography or industry coding changes).

Table 9 also contains match rates of these annual ITS files to the existing longitudinally-linked microdata – in particular, the CMs of 1963 and 1967. We see that the match rates decline as we move away from 1963 – ranging from an unweighted rate of 47% in 1954 (i.e., 47% of 1954 IDs can be found in the 1963 CM file) to virtually 100% in 1963.³⁸ On an employment-weight basis, the match rate is 56% in 1954. We certainly expect match rates to decline as we move further back in time, since a non-trivial number of establishments will have died in the interim. However, there are certainly broken establishment identifier links. In the future, we will attempt to make use of the additional establishment identifier variables on the file along with characteristics matching (e.g., 4-digit SIC, county, size class) to improve longitudinal linkages.³⁹

³⁸ It is more difficult to assess the quality of the ID links to the CM files using geographic and industry information since the geography and industry information on the existing CM files have been revised for consistency with later files (and corrected for select problems).

³⁹ We'll note that just over two hundred additional matches are found using identifier TN. Besides OLDID and PPN, we'll note that the final nine digits of the ID variable for single-unit firms is the firm's EIN, which can be used to match these cases to the 1967 CM – provided they survived that far.

The previously mentioned file, read in by the record layout named “Finder File Prep” (ITS-2, see Appendix E), may also be key.

Finally, to get an idea of how this group of files can be linked to the ASM files recovered for 1966-1972, we link the 1964 ITS ASM data to the 1966 ASM data discussed in Section 2. We get a match rate of 55% using simple ID linking. This low rate is not necessarily surprising since a new panel of establishments was chosen for the wave beginning in 1965. The matched cases are likely from “certainty companies” while the unmatched ones are likely smaller, non-certainty cases.

4. The longitudinally-linked ASM data for 25 industries for 1954-1961

The data in this group were recovered from the Unisys Clearpath in October 2009. The source of these data were the 4 tapes and 4 files associated with Data Storage Action Request 79-120, of which 4 were successfully recovered, but only 3 have discernable information (at least so far).⁴⁰ The title given to these data on this DSAR was the “25 Industry Time Series”. In the previous section, we discussed the broader context around these particular files. For better or worse, we’ve come to call these the “ITS prototype” files.

Twenty-five industries were chosen for this endeavor. As described by Conklin (1964): “For the most part these industries are heavily capitalized, the establishments tend to be large and, therefore, intensively sampled in the Annual Survey of Manufactures. Most of the larger industries in SIC Group 33, Primary Metals, are included; otherwise the selection is widely scattered.” Besides the limited scope, the prototype had one other very key difference with the

⁴⁰ This DSAR was executed in April 1979, after UNISERVO III-A tapes associated with DSAR 67-149 were copied to UNISERVO VIII-C 9 track tapes. This earlier DSAR appears to no longer exist.

data discussed in the previous section: by design, it guaranteed longitudinally-consistent establishment identifiers. As Conklin put it:

The basic data were organized not by the mechanical association of computer tapes but rather by going back to the original report forms and transcribing and punching selected data items on a clerical basis prior to converting the time series to computer tapes. From the point of view of the Census Bureau the objective of this 25-industry experiment are threefold: (1) To create a relatively small record that can be used for testing various kinds of data rearrangements and analyses of the types described earlier; (2) To develop some examples of analytical results as a means of communicating with other agencies of Government, universities, research organizations, and the business community so that they could help us in reaching decisions as to the general dimensions of the overall project; and (3) To establish a basis for evaluating the effectiveness of the computer matching techniques and to set standards as to the amount of clerical or professional work that would be desirable in correcting the computer matched records.

A considerable amount of effort has been invested in reviewing, completing, correcting, and matching the plant records for the 25-industry study. It has been possible to accomplish this because relatively few (about 2,500) establishments are involved. While some errors remain it is hoped that the file will suffice for the purposes intended.

At the time Conklin was writing, the data already covered 1954-1961, and we have evidence that 1962 and 1963 were eventually added as well. Conklin also states that “for 15 industries, data for 1947 and for the annual surveys prior to 1954 [i.e., 1949-1953] have been added to the record....However, some of the establishment records are incomplete for the earlier years.”

As noted in the previous section, Conklin himself used these data in constructing his experimental tables and charts, and the paper includes an appendix describing the data, including lists of the 25 industries and of the variables. At least a few other researchers also used this ITS prototype. Jordan (1965) presents results using a new, experimental measure of plant capacity. The ultimate goal of this line of research was “to incorporate a measure of performance potential in the basic computer record for every Annual Survey of Manufactures establishment.” For three of the 25 industries, Krishna (1967) estimates plant-level production functions and examines the

issue of economies of scale.⁴¹ Klotz (1970), in a fairly lengthy monograph, also examines productivity, and in particular, whether CES production functions fit the plant-level data better than Cobb-Douglas functions, whether large plants are more efficient than smaller ones, and whether, as plant size increases, there are ranges of increasing, constant, and decreasing returns to scale. Besides being interesting in their own right, all four of these papers are useful in demonstrating how the variables available in the ITS can be used to derive other meaningful variables.⁴² And Jordan, Krishna, and Klotz all have lengthy discussions on the measurement of capital stock and capital services. Each details how he constructed his capital measures, using both ITS and other data, and the limitations inherent in these measures.⁴³ These papers are also useful as sources of information about possible deflators. Outside of these four studies, we have found no others that have used the ITS prototype, and none of the several mentioned in Conklin (1964).

As with the files discussed in the previous section, little is documented about the files and how they relate to one another. Four files were successfully recovered, but only three have discernable information (at least so far). In the DSAR, they are named FIRSTOUTPUT, MENDOUTPUT, and TS54EOUTPUT.⁴⁴ The DSAR states, as Conklin (1964) suggested, that

⁴¹ This may well be the first Ph.D. dissertation to use confidential manufacturing microdata from the Census Bureau. Decades later, the two of us would follow in Krishna's footsteps. His access to these data, however, was very different. At the University of Chicago, Krishna wrote a FORTRAN program, that he tested on fabricated data, that identified and removed outliers, performed the necessary transformations to construct regressors and regressands, and computed various matrices "of sums of squares and sums of products of deviations from the means of the variables, for each industry" as well as some constant terms. He sent this program (along with some grant money) to the Census Bureau, which executed the program on its UNIVAC 1107 and sent the resulting matrices (on magnetic tape as well as paper printouts) back to Krishna. With this output, Krishna then ran his regressions using the Brookings Institution's IBM 7040.

⁴² See, for example, pages 13-18 of Klotz (1970).

⁴³ Klotz (1970) is different from the other two researchers in that he does not attempt to construct *annual* capital measures, instead performing cross-sectional analyses using 1957 and 1963, because of the availability of gross book value of capital in those two years.

⁴⁴ The fourth file was named TEDS26OUTPUT. The DSAR states that "outputs from TEDS26 program are binary unformatted tapes." In contrast, the "outputs from FIRSTA, MEND, and TS54E programs are FORTRAN formatted tapes."

these files were “intended primarily as a test deck for various kinds of time series tabulations and edits.” The DSAR also includes two pages, photocopied directly from the appendix of Conklin (1964), listing the 25 industries and some of the variables included, and including some other basic information. Two unique record layouts are included in the DSAR – one for FIRSTA and MEND, the other for TS54E. We include the latter in Appendix J. This record layout appears to be a superset of the former.⁴⁵

Briefly, for each year (1954-1961), these ITS prototype files contains basic measures of establishment activity, including output (value of shipments, adjusted value added, inventories, specialization ratio), employment (total, production workers, total manhours, peak manhours), payroll (total, production workers), cost of materials, and capital expenditures (total, new structures). In addition, the files contain measures of activity at certain points in time, including value of shipments by 5-digit product (1961), gross book value of capital assets (1957), accumulated depreciation (1956), depreciation (1957), retirements (1957), costs of fuels and electricity (1954, 1961), horsepower usage (1954), payments for employee pension & legally-required insurance plans (1957), insurance premiums & property taxes (1957), among others.⁴⁶ Other time-invariant characteristics include the 4-digit SIC industry code in 1958, state & county codes, and birth & death years. The full list of variables and definitions appears in Table 10. Variable definitions were created with help from Conklin (1964), Jordan (1965), Hanna (1959), and U.S. Bureau of the Census (1957, 1961). Variable names were created by us, and are subject to change in the future. The available variables are also summarized in Table 2.

The three files that were recovered are very similar, but not identical. Table 11 contains some basic information about them. The files are very close in terms of the number of unique

⁴⁵ The differences between the TS54E layout and that for FIRSTA/MEND appear to be limited to the 19 flags at the end line 1 and the four derived variables at the end of line 4 on page 2.

⁴⁶ The variables from 1956 and 1957 come from Form MC-D11, discussed in the previous section.

plants (ID values), with 1,808 in FIRSTA and 1,807 in MEND and in TS54E. The overlap among these ID values is very high, but not perfect, with 1,802 IDs in common across all three files. We see that the number of ID-year observations varies across these files. We find that there are some duplicate ID-year observations in FIRSTA (just 1) and especially in TS54E (1,948). FIRSTA's one duplicate is an exact duplicate in *all* variables, while TS54E contains 1,705 ID-year observations that are an exact duplicate of another observation in all variables (except for the inconsequential SEQ_TYPE2 variable). Thus there are 243 (=1948–1705) observations in TS54E that have duplicate ID-year values, but are not exact duplicates for all data items. It turns out that the duplicate pairs differ only in the value of their flags and derived items, mainly SC57 and SUMCE_ASSETS.⁴⁷ In terms of the comparability of data items between files, it is again high but not perfect. For example, of the 1,802 IDs and 14,415 ID-years in common to FIRSTA and MEND, 417 ID-years have at least one difference. These 417 observations belong to 145 unique plants. Much more understanding is needed to construct a gold standard version of the ITS prototype (or to recognize that one of these files is already the ultimate version).⁴⁸

Until that time, and for the purposes of this paper, we use the data contained in the FIRSTA file, realizing that the numbers may/will vary if one of the other files is used. With that caveat, Table 12 presents the sample size, by industry, and compares it to the total number of establishments in the industry, according to 1958 CM publications. We see that the ITS prototype has about half of the universe of establishments in these industries, and about three-quarters of the larger establishments (with 20 or more employees). Table 13 shows the coverage

⁴⁷ In these cases, we should be able to compute the derived variables ourselves and remove the incorrect observations.

⁴⁸ To gain some understanding of the differences between these files, we can look to completed survey forms available on microfilm, which we have begun to do. We can also examine the questionable cases, as they appear in the (full) ITS, described in the previous section.

of the ITS prototype sample relative to the universe, in terms of establishments, value of shipments, total employees, and capital expenditures in 1958.⁴⁹ Depending on the industry, the ITS prototype has between 7% to 100% of the plants in an industry, with a median of 61%. On an activity-weighted basis, however, the ITS prototype has 85-100% of these industries, with a median of 97-99% coverage.^{50,51} The ITS prototype certainly appears to have all the establishments “that matter”. In Table 14, we speak to these 25 industries vis-à-vis the manufacturing sector as a whole. According to published statistics, while these 25 industries collectively accounted for just over 1% of manufacturing establishments in 1958, they had 11% of value added, 8% of employment, and about 25% of capital expenditures.⁵² This sample of 1,808 tracks these numbers fairly closely.

For each of these 1,808 establishments, we have data for 1954-1961. It is worth noting that we do not have data for 1962 and 1963 in any of the files, despite evidence that such a version of the ITS prototype once existed (Krishna 1967, Klotz 1970). We also note that there is no data here from *before* 1954, as described by Conklin (1964) rather explicitly. Curiously, of the studies we have found so far that employed ITS data, none use or even mention these older data. It is not clear what became of them, or why we (only) have an ITS prototype file of this particular vintage.

In any event, we explored whether these 1,808 large establishments can be linked longitudinally to the existing longitudinally-linked manufacturing microdata that we currently

⁴⁹ Here we restrict our attention to “active” establishments, where employment or value of shipments is nonzero in 1958.

⁵⁰ The one exception here is SIC 3362 (Brass, bronze, copper castings). Klotz (1970) excludes this industry from his analyses.

⁵¹ This is consistent with Jordan (1965) who states that on an “unweighted basis, the sample cases accounted for over 95 percent of the universe.” He goes on to say that “because of this high coverage, no attempt was made ... to weight estimates for small establishments.” This is somewhat a moot point since there is no weight variable in these files. Presumably most of these cases would have a weight close to or equal to 1.00 anyway.

⁵² As previously noted, capital-intensive industries were deliberately chosen for this prototype.

have. To do so, we matched the only plant ID variable present in the ITS prototype (reported to be the 1961 ID variable) to the variable ID (not PPN) in the 1963 CM. The simple match rate is about 83%, and about 93% on an activity-weighted basis. The (unweighted) match rate varies by 4-digit SIC industry from 69% to 100%, with a median of about 82%. We are fairly confident that these are more than just spurious matches: Of the matched cases, over 93% share the same 4-digit SIC, about 97% share the same county, and about 91% share the same 4-digit SIC *and* county.

More work can and should be done to understand the 17% of cases that did not match. Are these establishments that closed, or did the ID number change (a broken link)? For each unmatched case, can we find a (unique) establishment in the 1963 CM that is in the same 4-digit SIC, same county, and (perhaps) same employment size class? If so, those might be the same establishment.

Even without any significant additional work, the ITS prototype has two immediate uses. First, it can potentially be used to make sense of the “full” ITS, described in the previous section. Indeed, the ITS prototype has already been useful to us in that regard. A simple ID-match with the “full” ITS (a) helped us verify our hunch that the year=1911 cases contained data from the 1957 MC-D11 survey, and (b) revealed the record positions of a number of the MC-D11 variables – enough for us to use the survey form itself to determine the remaining MC-D11 variables and their positions. And since the ITS prototype has unquestioned longitudinal links, by virtue of its construction, it can potentially shed light on the state of the longitudinal linking that was attempted and abandoned in the “full” ITS. The second immediate use is for eight more years of microdata on a number of enormous manufacturing establishments. To the extent that some of them are still alive today, their data would span over a half century (1954-2009), with

only eight missing years at this point (1962, 1964-66, 1968-71). With some effort, their data for these years can be found in the files described in Sections 2 and 3.

As interesting as the ITS prototype data may be, the data described in the previous two sections obviously have significantly more potential and should be the immediate focus of future efforts.

5. The individual ASMs of 1953 and 1955-1956

The data in this group were recovered from the Unisys Clearpath by Alfred Nucci in April 2006.⁵³ The sources of these data were the 3 tapes and 3 files associated with Data Storage Action Requests 79-138, 79-140, and 79-139.⁵⁴ An unfortunate aspect of these particular files is that their record layouts no longer exist. Nevertheless, we have made significant progress in making proper datasets for at least 1955 and 1956. The keys to deciphering the long string of numbers in a record proved to be (1) the image of the punch card in the appendix of the ASM publication for the respective year (see Appendix K), and (2) the microfilm of completed ASM survey forms for the period 1954-1958 (discussed in a later section). Meanwhile, deciphering the 1953 file has proven much more difficult because we do not have the benefit of microfilm covering this year, we have not yet found an establishment identifier that allows linking to other years of data, and the punch card image for 1953 has thus far proven insufficient to identify the location of all variables in the file.⁵⁵ In addition, the 1953 data appears to have only 23,804

⁵³ As noted in Section 2, Nucci used a different methodology to recover these files from the Unisys mainframe. In January 2010, we extracted these same files using the alternate methodology described in the introduction – as insurance against possible errors. Thus far, we have no reason to believe that there are any errors in the files from 2006.

⁵⁴ These DSARs were executed in April 1979, after UNISERVO II-A “Hi-pack” tapes associated with DSAR 59-015, 60-022, and 59-016 were copied to UNISERVO VIII-C 9 track tapes. These earlier DSARs no longer exist.

⁵⁵ We think we have successfully identified several variables based on the punch card, including an establishment identifier, state code, county code, industry code, payroll, and employment. Further work could potentially identify additional variables (e.g., by attempting to use the data to replicate published totals for an industry heavily

unique observations. This is significantly less than the approximately 52,000 observations expected (based on the 1953 ASM publication). For these reasons, we postpone further exploration of the 1953 file.

Table 2 summarizes the variables contained in the 1955 and 1956 files. Note that both of these files also include *prior year* data on all the same variables. For both of these years (and their prior years), the data include output measures, including total value of shipments and various inventory measures (total, finished products, work-in-progress, materials). The data also include employment measures, including total employment, production workers, and man-hours of production workers. In addition to payroll measures, including total payroll and the salaries and wages of production and non-production workers, these data include various other production costs, including the costs of materials and supplies, fuels, electricity, contract work, and so forth. The data also include details on capital expenditures (total, equipment, structures, new, and used) and kilowatt-hours of electricity purchased, generated, and sold/transferred. Other notable variables include 4-digit SIC industry code, state and county codes, sample weight, and ID. It should also be noted that there are a small number of continuous variables that currently remain unidentified, as well as a number of categorical variables. Other establishment identifiers may be here. Meanwhile, there are also a few variables on the punch card (see Appendix K) that have not been identified in the microdata, including panel group code, card number, prior year industry, and product class. Note that, with the exception of a number of key variables, we have not verified that all variables are filled with non-missing values in both years, let alone sensible values.

dominated by certainty cases with weight 1.00). Meanwhile, the establishment identifier present in the 1953 data is only 9 digits long – not 10 digits, as in later years.

Table 15 shows the number of observations, the number of observations with positive payroll and employment, and the number of observations suggested by each year's ASM publications.⁵⁶ As discussed earlier, the number of establishments in the 1953 file is less than half of the expected number. Because the 1953 data has not been read in completely, there may be some chance (however unlikely) that there is data for more than one establishment in each line of data. Meanwhile, the 1954 count is based on the number of plants in the 1955 ASM file with positive *prior year* employment and payroll. While the 1954 CM publication makes no specific mention of how many ASM cases there were in the year, we expect it to be between 52,000 and “about 45,000”, which are the numbers mentioned in the 1953 and 1955 ASM publication, respectively. Jordan (1965) states that there are around 45,000 records in 1954. This is quite a bit larger than the 37,788 found here. Recall that the 1954 file from the ITS, discussed in Section 3, is also smaller than expected. The number of observations in the 1955 files is also smaller than expected, while the number in the 1956 file is fairly close to the expected number. The counts for each of these files are all lower, by several thousand, than the counts seen for the same years in Table 8 for the ITS.

In exploring these 1955 and 1956 ASM files, we discovered that there are a number of industries missing. In particular, in 1955, nine expected 4-digit SIC industries in the range SIC 2011-2026 are missing along with industries in Ordnance and accessories (SIC 19--). In 1956, these same industries are missing plus seven others in the range SIC 2027-2036. The missing industries in SIC 19 and 20 were not unexpected since the DSARs mention tapes whose data

⁵⁶ Here, observations that were exact duplicates across all variables have been removed from these datasets, while ID-year duplicates with different data in any variables are retained.

could not be salvaged.⁵⁷ Meanwhile, all states are represented (except then-territories Alaska and Hawaii).

To evaluate the reasonableness of the data in these files, we made some attempts to weight and tabulate the microdata and compare to the results to published totals, at the 4-digit SIC level. The distribution of differences is certainly centered close to zero, but a significant number of industries have differences substantially different from zero (see Ladner 2008). This may be indicative of statements made by several commentators (cited above) that corrections to records were often not carried back to back to the (microdata) tapes. Complicating this effort further, we discovered records with identical IDs, sometimes (but not always) with identical values for variables. Furthermore, nearly a quarter of observations in 1955, and nearly 9% in 1956, have a weight of zero. (In turn, many of those with zero weight in 1955, have a weight of one in 1956.) It is not precisely clear what the situation is here.⁵⁸

Much of this activity occurred in 2007 and 2008 without the benefit of knowledge and information we have since acquired, including the ITS data (and paper) files. Revisiting and recontemplating these files will be worthwhile and necessary, as they may help us understand the ITS files and may serve as complements to those files.⁵⁹ ID match rates between these 1955 and 1956 files and those in the ITS are fairly high, considering we are missing blocks of data/industries in these files. We find that over 75% of IDs in the 1955 ITS file match to the

⁵⁷ In particular, DSAR 79-140 (1955 ASM) notes that “Tape HC1707 was omitted from run – unable to salvage tape, data on tape not written in standard language. Tape was to be data for cut 19-21, reel 1 of 4.” And DSAR 79-139 (1956 ASM) notes “Tape HM33757 was omitted from this run. Tape was rejected – Unable to salvage tape. Tape contained data for Industry cut 19-21, reels 1/5 and 2/5 (4000 records).”

⁵⁸ One thing to recognize is that the published totals in non-CM years are not simply a weighting of ASM microdata, as we attempt here. Rather, a (weighted) year-over-year change is estimated with microdata and applied to prior year totals, originating from the prior CM and moved forward.

⁵⁹ We may also now have more knowledge and information to allow us to better decipher the file containing the 1953 ASM.

1955 file here, and about 89% of IDs in the 1956 ITS file match to the 1956 file here.⁶⁰

Conditional on an ID match, the match rates for the values of 4-digit industry, state, payroll, employment, and shipments are all relatively high, between 95 and 99 percent.

6. The Ruggles Files (1954-1959 ASM)

The data in this group were recovered from the Unisys Clearpath in February 2010. The source of these data were the 2 tapes associated with Data Storage Action Request 79-147.⁶¹ The title given to these data on this DSAR was the “Ruggles Sorted Year Pairs / Ruggles Run Main File” and the file names mention the 1954-1959 ASM.⁶² Unfortunately, the DSAR we have does not contain a record layout, and its predecessor (65-094) has not been found. About all we know at this point is from Conklin (1964):

The most extensive project is one being carried on as a joint venture of the Social Science Research Council and the Census Bureau. Much of the pioneering thought on the use of the [Industrial Time Series] file and of the development techniques for matching records stems from this (the Ruggles) project which will cover the years 1954 through 1959. This study, entitled The Behavior and the Characteristics of Manufacturing in the United States, 1954-1959, uses the Annual Survey of Manufactures computer tapes for all industries for the years 1954-1959 and supplementary data for 1957 on nonpayroll labor costs, cost of maintenance and repair, insurance, rent, taxes and depreciation, book value and retirements of depreciable assets. The study is a micro-analysis dealing with economic behavior and characteristics at the establishment level rather than at the industry level. It is aimed at the exploration of (a) price-cost behavior, (b) wage behavior, (c) productivity and growth behavior, and (d) investment and net margin behavior.

⁶⁰ In 1955, nearly 25% of the establishments in the ITS file that do not match to the 1955 file here are in industries 1911-2027. In 1956, close to 70% of the non-matched observations are in industries 1911-2037. About 95% of the IDs in the 1955 and 1956 files here can be matched to the corresponding files in the ITS. Here, the non-matched observations do not appear to be heavily concentrated in specific industries.

⁶¹ This DSAR was executed in April 1979, after UNISERVO III-A tapes associated with DSAR 65-094 were copied to UNISERVO VIII-C 9 track tapes.

⁶² Richard Ruggles was a professor of economics at Yale University from 1946 to 1985, and his wife Nancy Ruggles was long affiliated with the United Nations Statistical Office. They were leaders in the field of national accounting and early advocates for the use of microdata, and the cross-sectional- and longitudinal-linking of such data. They were also the force that initiated the longitudinal manufacturing microdata that CES has today.

We have not yet been able to locate the named study, or one like it. The lack of a record layout has, so far, kept us from exploring these files.⁶³ Some of the other sources of data described in this paper may prove very helpful in eventually deciphering these data.

7. Microfilm of completed survey forms from the 1954-1958 ASMs and the 1958 CM

Ten years ago, CES came to acquire 325 rolls of 16 mm microfilm on open reels containing images of completed survey forms from the 1954-1958 ASMs as well as the 1958 CM. In November 2010, we discovered and acquired 226 more such rolls, for a total of 551.⁶⁴

In exploring this microfilm, we find at least three different types of respondent cases.⁶⁵ First, there are establishments that were required to report full census detail, because they were above a given size in terms of number of employees. These establishments received a “standard form” – the first two pages of which included the same data items, regardless of industry, while the remaining pages (upwards of 6 additional pages) differed by industry or industry group, with detailed inquiries on individual products shipped, individual materials consumed, and other items (e.g., types of operation and equipment). There were almost 200 different standard forms, to accommodate the approximately 425 manufacturing industries. A second type of respondent was establishments that were in the ASM panel from 1954-58. Here, the 2-page ASM “shuttle” form (see Appendix F), with columns and data for each year from 1954 to 1958, was followed by

⁶³ Difficulties in reading and recovering these files also required an unorthodox approach which yielded 107 files of partial data, using various character set assumptions. A note on the DSAR states that the “data on original tape was not written in standard language.”

⁶⁴ In November 2010, we also came to acquire 93 microfilm cartridges from the 1967 CM and 77 microfilm cartridges associated with a variety of surveys – mainly ASMs from the 1970s it seems. Without a microfilm reader that can accommodate cartridges, we have not viewed any of this microfilm. Since we already have microdata for these particular surveys and years, we consider this set of microfilm out of scope to the current discussion. We will note, however, that the 1967 CM microfilm could be useful in creating a mapping between establishment name & address and other Census Bureau establishment identifiers, which would be helpful for linking to outside sources of data or even historical Census data also on microfilm.

⁶⁵ In June 2009, we acquired via GSA surplus a Bell & Howell ABR-2000 microfilm reader/printer with motorized control. Prior to this acquisition, we used the microfilm/reader available in the Census Bureau library.

pages 3 and on from the “standard form” for the industry. Finally, establishments below the given employment cutoff (generally 4 to 10 employees, depending on the industry) received a short 2-page survey form without much detail. There were 20 different short forms used, each covering a 2-digit SIC group. In certain industries, where smaller establishments were common and accounted for a substantial portion of an industry’s activity, a modified short form with some additional inquiries was used. We do not know (or do not recall at this point) whether the microfilm includes any of the other survey forms associated with the 1958 CM, including those for manufacturing plants under construction, central administrative offices and auxiliaries, class of customer, industrial water use, and the MC-D11 (discussed previously). We do know that survey forms from the 1958 Census of Mineral Industries are contained on this microfilm.

There are other notable things about this microfilm. First, by luck, we discovered a small form called an “Economic Census Schedule Pulling Request” on which a Census Bureau employee had recorded the industry code, state/county, and employer identification number of a survey form that must have been removed from the batch for whatever purpose. The form was signed October 21, 1966, suggesting that the imaging of these survey forms occurred quite some time after the 1958 CM. (It also suggests that at least one survey form may be missing from this set of microfilm.⁶⁶) Another fact worth noting is that the forms tend to be batched by industry and state/region. We had an intern record the industry and state of both the first and last survey form on each roll, which has given us some (albeit very limited) ability to find survey forms of cases we see in the microdata. This also led us to discover that some of the rolls are exact copies of each other. At this point, we have not attempted to determine how many *unique* rolls

⁶⁶ This missing case happens to be in the ITS prototype. Interestingly, the signature on the pull request is “Katz”, who is also the person that prepared the record layout for the ITS prototype, dated August 16, 1967. The pull request appears on the roll we have labeled #159.

there are among these 551. We'll also note that some rolls consist of a single stream of images, while others consist of a double stream.⁶⁷

We have pondered and investigated what it would take to make this into electronic data. As part of our investigation, we spoke with experts at the National Archives and Records Administration (NARA) as well as three contractors. To start, a digital image must be taken of each page on the microfilm. If nothing else, this would provide a long-term storage solution and prevention from loss from decay or disaster. To make this long string of images minimally usable, the pages of a single form must be associated with one another, and the form would be indexed – at a minimum, perhaps by form number/type, state, and 4-digit SIC industry. In this case, optical character recognition is not practical; indexing must be performed by human. With the proper software (and enough labor), this indexing could occur in-house. Once indexed, the form images are then at least searchable, so that a researcher interested in a particular industry could, in principal, find all the relevant survey forms and key in the required data. Of course, the ultimate goal would be to have all the data from all forms keyed in. Relative to the costs up to this point, keying in an entire Census of Manufactures is likely extraordinarily expensive.

Certainly the biggest interest in this microfilm, from our perspective, is the possibility of having (electronic) data on the entire universe of manufacturing establishments in 1958 – the CM before the oldest CM we currently have (1963). With these records, one could explore industry dynamics, such as plant entry and exit, which one simply cannot do with ASM cases alone. A big unknown at this point is whether the microfilm actually contains the nearly 300,000

⁶⁷ In the original set of 325 rolls, 187 have a single stream, while 138 are double stacked.

manufacturing establishments in existence in 1958. Back-of-the-envelope calculations suggest that it is possible.⁶⁸

Even if the microfilm is incomplete, there is no doubt that there is a significant amount of (new) data here. Even for cases that we have data for in electronic form, there is even more data to be had here, including the value and quantities of products produced (at the 8-digit product level), intrafirm transfers by 8-digit product, cost and quantities of materials used and fuels consumed, special inquiries, and obviously any write-in information. (See Table 2 for a summary.) In essence, any variable and any data on any standard form, ASM form, short form, and modified short form will obviously be here. Note that name, address, EIN, and other establishment identifiers on these forms are important for linking these records to other data on these establishments, including earlier data.

Even if the microfilm is not digitized in the foreseeable future, it can be – and has been – an extremely useful resource in making sense of the electronic files described in the previous sections. For example, without the microfilm, prospects for figuring out the record layout for the 1955 and 1956 ASM files (discussed in Section 5) would be bleak. In this case, we printed out some random ASM forms from the microfilm, located the plant ID, searched the raw data for that plant ID string, and with the completed survey form in front of us we could puzzle out the location and length of the vast majority of variables. We have also used the microfilm to make sense of the ITS prototype – in particular, for gaining insight into the differences between the

⁶⁸ For the initial batch of 325 rolls, we had an intern determine how many contained a single versus a double stream of images. We also had him count the total number of pages on a couple of randomly chosen rolls. From that, and setting aside the fact that the rolls are sometimes of different lengths, we estimated approximately 1.2 million pages, which seemed to us to be the right order of magnitude. Present in that total, however, are forms from the Census of Mineral Industries and possibly other (supplemental) manufacturing surveys. We also later discovered that the set of 325 rolls had duplicates among them. But then we also later acquired 226 additional rolls of microfilm containing the 1958 CM. Casual inspection revealed that at least some of these are duplicates of those in the first set. Without more work, we simply do not know how many *unique* rolls we have, which is currently the biggest hindrance to a more accurate estimate of the number of page images.

FIRSTA, MEND, and TS54E files. For one example, we could see exactly how the definitions of SPEC58 and SPEC differed between FIRSTA and MEND (and the definitions that appear on the record layout). In addition to the ITS, we suspect that the microfilm might also prove very useful in shedding light on the Ruggles files, described in the previous section.

We'll note briefly that in addition to this microfilm held by CES, NARA maintains microfilm copies of completed CM survey forms from 1947 to potentially as far back as 1820 (see NARA 1964, 2011).⁶⁹ Unfortunately, we have not found any evidence that any microfilm from the 1954 CM still exists, either at the Census Bureau, or held on its behalf at NARA, or in the public domain at NARA. The microfilm from the 1947 CM – the next nearest one – is, we are told, on acetate film and in a very fragile state.⁷⁰ Preservation and restoration of the microfilm would probably be necessary before anything could be done with it. Meanwhile, the microfilm of the biennial CMs from 1929 into the 1930s have been used by a number of researchers (e.g., Foss 1981; Bresnahan and Raff 1991; Bertin, Bresnahan, and Raff 1996; Raff 1998). Some of these data have recently been made available electronically.⁷¹ Conklin (1982) mentions another source of information that may certainly worth searching for in the Census Bureau's archive:

The background of the consideration [of a microdata file of individual plant data] was in the late 1940's; there was 'rediscovered' in the Industry Division of the Census Bureau a file of 5x8 cards relating to the biennial census of manufactures

⁶⁹ Data on manufacturing was first collected in 1810 (Micarelli 1998).

⁷⁰ At the time we were investigating this, in 2007, NARA did not know exactly where this microfilm was being stored. But staff at both NARA and the Census Bureau had distinct memories of the accessioning, and the condition of the film, dating from "perhaps a decade ago." An accessioning in the late 1990s would be consistent with the "50 year rule" the Census Bureau had used to honor the confidentiality of business data.

⁷¹ In particular, panelized data for the automotive and textile industries from the CMs of 1929-1935 have recently been made available through the Interuniversity Consortium for Political and Social Research (ICPSR). See Raff and Bresnahan (ICPSR31761-v1). In addition, these data have been linked with industry data on automobile characteristics to create hedonic prices for the automotive industry from 1906-1941 (Raff and Trajtenberg, ICPSR31762-v1). Digitization and panelization of establishment-level data from the 1929-1935 CMs has been completed for several other industries, including cigarettes, steel, tin cans, rubber tires, petroleum, glass, soap, linoleum and sugar refining. These data are expected to be available from ICPSR in the near future. We thank Maggie Levenstein for this information.

from 1929 to 1939. Each card contained for an individual plant the records of employment, payrolls, cost of material, value of shipments, and value added for 1929 and each odd-numbered year in the 1930's. As I remember it some 35 years ago, the file was duplicated with one set organized geographically by industry and the other industry by geography. The file serves as an important check on the completeness of the census, but the primary purpose was to determine whether publication would involve disclosure. It was called the 'yes-no' file. I do not know whether it still exists, but I do know that it was tantalizing to realize that here was a massive micro record of manufacturing during the great depression. To attempt to organize and analyze it with existing equipment (there was not even Univac I) was far beyond our resources. Also, it wasn't in our job descriptions. But the 'yes-no' files did encourage some of us to try a few years later to plan for a micro file for the Annual Survey of Manufactures.

8. Conclusion

Our analyses show that longitudinally-linked microdata on manufactures, covering 1954 to the present, appear possible though very challenging. With the exception of a few years with fewer cases than we would expect (particularly 1953 and perhaps 1954), and 1965, for which we have no data at all, it appears possible that we have data on all ASM establishments over this period. The biggest challenge, will be constructing longitudinal links from these ASM files to the existing longitudinally-linked microdata – in particular, the CMs of 1963, 1967, and 1972. The naïveté of matching algorithms yields match rates of 75% to 96% for the ASM files in the 1960s and early 1970s. On an employment-weighted basis, these rates are 86% or better. Match rates decline, however, monotonically, as the time to the 1963 CM increases – falling to just 48% in 1954 (and 56% on a weighted basis), though substantially better for select industries thanks to the ITS prototype. These match rates can be improved upon through the use of multiple establishment identifiers and by other means (such as characteristics matching), but the task will prove challenging. Adding to the challenge is the tangle of (undocumented) files from 1954-1964. There are also the sobering (if sometimes vague) assessments offered by commentators

from decades ago that led to the abandonment of these files in the late-1960s along with all efforts to longitudinally link them — assessments that still held currency over a decade later when these files were explicitly ignored in favor of the more modern ASM and CM files, in an effort that was the basis for the longitudinally-linked manufacturing microdata we have today.

Obviously, much more work needs to be done. However, we see tremendous value in extending the manufacturing microdata series back into time. Better still if data contained on the microfilm of the 1958 CM (and the earlier CMs) can also be incorporated. With these “new” data, new lines of research become possible, and many others can be revisited.

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TABLE 1
Sources of the 1966-1972 ASM Files Recovered by Alfred Nucci in May 2006

Year	Reel number	DSAR	Title and subtitle of DSAR	File name	Comments
1966	021754	78-136	1967 ASM: 1967 ASM Register Prep	IN67ASM*ASMRGPREPOUT	File name and DSAR description doesn't necessarily suggest <i>final</i> 1966 data.
1967	021756	78-137	1967 ASM: 1968 Final Edited PY	IN67ASM*68FNEDTPYOUT	
1968	021763	78-129	1968 ASM: 1968 Final Edited PY	IN68ASM*69FNEDTPYOUT	Subtitle is misleading. May be a typo.
1969	021760	78-139	1969 ASM: 1968 Final Edited CY	IN69ASM*69FNEDTCYOUT	
1970	021773	78-132	1971 ASM Finals - 1970 Data: PY Edited	IN71ASM*70FNEDTPYOUT	Unlike other years, records carried over onto a second tape (reel #130834). It appears that this second tape, with 4,132 records, was not read/copied by Nucci. We recovered data from this second tape in November 2009 but have not yet incorporated these additional records.
1971	021775	Unknown		IN72ASM*72MERGERGOUT	File name doesn't necessarily suggest final 1971 data.
1972	021793	Unknown		IN73ASM*72FNEDTPYOUT	

TABLE 2
Summary of Variables in Newly Recovered Manufacturing Microdata

	ITS (25 industries)	Microfilm of survey forms	ITS (All industries)	Individual ASMs	Individual ASMs
Years	1954-61	1954-58	1954-64	1955-56 (and 1954*)	1966-72
BASICS					
Industry (4-digit SIC)	•	•	•	•	•
State & county	•	•	•	•	•
Place					?
Weight		?	•	•	•
Name & address		•			
EIN		•			
OUTPUT					
Total value of shipments	•	•	•	•	•
Total inventories		•	•	•	•
Finished products inventories	• inc. 1953	•	•	•	•
Work-in-progress inventories	• inc. 1953	•	•	•	•
Materials, supplies, fuels, etc. inventories		•	•	•	•
Value added (adjusted or unadjusted)	•		•		•
LABOR					
Total employees	•	•	•	•	•
Non-production workers		•	•	•	•
Production workers	•	•	•	•	•
Production workers, by quarter		•	•		•
Production worker man-hours, total	•	•	•	•	•
Production worker man-hours, by quarter		•	•		•
Peak quarter man-hours	•				
Total payroll	•	•	•	•	•
Non-production worker payroll		•	•	•	•
Production worker wages	•	•	•	•	•
Legally required supplemental labor costs					•
Voluntary supplemental labor costs					•
Supplemental employee costs	see below		see below		
MATERIALS					
Total cost of materials, etc.	•	•	•	•	•
Materials, parts, containers, supplies, etc.		•	•	•	•
Products bought and resold		•	•	•	•
Cost of fuels	1954, 1961	•	•	•	•
Cost of electricity	1954, 1961	•	•	•	•
Cost of contract work		•	•	•	•
Purchased electric (kwh)		•	•	•	•
Generated electric (kwh)		•	•	•	•
Electricity sold / transferred		•	•	•	•

CAPITAL

Total capital expenditures	•	•	•	•	•
Capital expenditures on new equipment		•	•	•	•
Capital expenditures on new structures	•	•	•	•	•
Capital expenditures, used		•	•	•	•
Gross book value of assets	1957		1957, 1962-1964		•
Gross book value of assets, structures					•
Gross book value of assets, equipment					•
Retirements	1957		1957, 1963-1964		•
Rental payments on structures			1963-1964		•
Rental payments on equipment			1963-1964		•
Rental payments on structures & equipment			1957		
Accumulated depreciation	1956		1956		
Depreciation	1957		1957		
Horsepower of power equipment	1954				

OTHER COSTS

Total expenditure for maintenance & repairs		1957			
Salaries & wages for maintenance & repairs		1957			
Other costs for maintenance & repairs		1957			
Selected supplementary employee costs	1957	1957			
Employer pymts for old age and survivors ins.		1957			
Employer pymts for unemployment ins.		1957			
Employer pymts for workmen's compensation		1957			
Employer pymts for various private plans		1957			
Insurance premiums and property taxes	1957	1957			
Insurance on property, inventories, etc.		1957			
Tax payments on property and inventories		1957			

PRODUCT DETAIL

Products produced (5-digit) & values	1961	•	•		•
Products produced (5-digit) & quantities	1961	•	1958-1964		•
Resales		•	•	•	•
Contract work done		•	•	•	•
Misc. receipts		•	•	•	•
Products produced (8-digit), values, quants		1958			
Intrafirm transfers, by product (8-digit)		1958			
Identity of primary (5-digit) product	•				
Specialization in primary product	•				

MATERIAL DETAIL

Materials used, quantities & cost	1958
Fuels consumed, quantities & cost	1958

MISCELLANEOUS

Prior year data (on above noted items)				•	
Various flags	•		•		•
Birth year, death year	•				
Status/ownership change		•	?		•
Remarks & analyst notations		•			
Other		1958		•	•

TABLE 3
Establishment Counts in the Individual ASM Files of 1966-1972

Year	Number of Establishments		
	Total	With Positive Payroll and Employment	Published Information
1966	66,419	62,493	about 60,000
1967	71,380	66,087	about 60,000
1968	71,994	65,948	about 60,000
1969	71,991	68,011	about 60,000
1970	70,250	63,716	about 65,000
1971	71,584	59,985	about 65,000
1972	75,389	68,626	n/a

TABLE 4
Linking the 1966-1972 ASMs to Each Other and to Existing Longitudinal Microdata:
Preliminary Match Rates Using ID Only

Year	t – 1		t + 1		1963 CM		1967 CM		1972 CM	
	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
1966			83.1	89.0	78.9	87.6	84.3	91.0		
1967	77.3	87.9	89.7	93.1	61.8	77.4	90.5	96.9	59.9	74.2
1968	88.8	94.5	99.9	99.9			81.2	90.6	65.3	79.3
1969	99.9	99.8	58.0	85.4			81.2	88.8	65.3	80.4
1970	59.3	84.6	82.3	88.5			68.6	81.2	76.6	85.7
1971	80.6	94.8	34.0	65.5			56.9	77.0	91.0	96.1
1972	36.7	64.2					84.3	91.0	52.1	66.7

TABLE 5
The 34 Files Read in Using the ITS-1 Record Layout

File Number	Number of Observations	DSAR
26221	17,991	
26223	3,511	
26225	90,167	
26227	88,035	
26229	92,664	69-068
26231	112,715	
26233	116,848	
26235	53,301	
26237	48,896	
26239	62,151	
27225	743	69-069
26241	91,403	
26243	90,884	
26247	114,967	69-070
27231	117,928	
27232	1,643	
27227	196	69-071
27229	1,253	
24982	1,053	
27237	90,442	
27239	88,272	
27241	93,210	
27243	114,400	69-091
27265	117,928	
27267	53,986	
27269	57,367	
27271	74,331	
26205	117,928	
26206	60,789	
26209	111,568	69-092
26211	112,868	
26214	64,958	
26202	18,667	69-093
18279	18,007	69-096

TABLE 6
Number of Observations and Description, by DSAR

DSAR	Number of Observations	Descriptive Information
69-068	686,279	ITS127 Correction - XPT = Detail without TN corrections; XPTA = detail with TN corrections; XPTB = deletes and duplicates
69-069	743	ITS Adds - Plant records for 1954-1963 discovered missing on the Finder File
69-070*	416,825	ITS Detail merged with corrected detail records from ITS127
69-071	1,449	ITS138 - duplicate TNs to be reviewed and corrected and ITS138 limited sample for future testing
69-091	690,989	ITS127 Input - Parts of file come from ITSTRP, ITS58, ITS60 and ITS135
69-092	468,111	ITS160 - Merged and Matched 1954-1964 MA-101 Data
69-093	18,667	ITS138 - records with TN changes from correction program are sorted and merged with adds punched - expanded, sorted, etc. from ITS137
69-096	18,007	Sorted and packed TN changes from ITS127 and All correction records from ITS149

* DSAR 69-070 is missing one file that could not be recovered.

TABLE 7
1954-1964 Industrial Time Series Files: Variables and Variable Definitions

Variable name	Description
ID	Establishment identification number (current year). 10-digit. For a plant in a multi-unit manufacturing firm, ID does not begin with 0, and the first 6 digits are identical for plants belonging to the same firm. For a single-unit plant/firm, ID begins with 0, and the 10-digit number uniquely identifies firm.
OLDID	Establishment identification number (prior year). 10-digit. For a plant in a multi-unit manufacturing firm, ID does not begin with 0, and the first 6 digits are identical for plants belonging to the same firm. For a single-unit plant/firm, ID begins with 0, and the 10-digit number uniquely identifies firm.
TN	Tab number. 6-digit.
PPN	Permanent plant number. 5-digit.
RECNO	Record number. 2-digit.
YR	Year. 2-digit.
SURVYR	Survey year. 2-digit.
SIC4	Standard Industrial Classification code (tabbed, current year). 4-digit. Major modifications in SIC codes and definitions occurred in 1958. Here, the 1954-1957 data use the previous SIC classification system. See Appendixes A, B, and C of U.S. Bureau of the Census (1961) for 1958 SIC industry codes, definitions, and descriptions of the revisions to industry definitions and code numbers. Appendix C in particular contains a mapping of new to old SIC codes, as well as the number and share of affected establishments, number and share of affected employees, and dollars and share of affected value added.
SIC4_DERIVED	Standard Industrial Classification code (derived, current year). 4-digit. See SIC4.
SIC4_PY	Standard Industrial Classification code (tabbed, prior year). 4-digit. See SIC4.
CENST	Census state code. 2-digit. The first digit indicates the Census division within the United States (1-9). The second digit indicates the state within the division. Not to be confused with the 2-digit FIPS state code (introduced in 1970). In 1958-1960, establishments in Alaska and Hawaii are coded as 01 and 02, respectively, and as 94 and 95 in 1961-1964. There are a relatively small number of cases with a missing or invalid state code.

COU

County code. 3-digit. It appears that at least three different coding schemes are in use here. In years **1954-1957**, the county code appears to be the one discussed in detail in Becker (2009). Briefly, within a state, the set of counties and county equivalents in existence *at that time* was ordered alphabetically and assigned a 3-digit code in ascending order, beginning with 001 and *using only the 219 codes with digits in a nondecreasing order*. (For example, 010, 020, and 021 are invalid codes.) There are two anomalous states. In Texas, the first 54 counties were given a code that is a transformation of the “expected” code. In particular, the leading zero is replaced with a 9 – from 901 (Anderson County) through 999 (Crosby County). Meanwhile, the final 200 Texas counties (alphabetically) were assigned ascending codes, beginning with 001 (Culberson County) and ending with 666 (Zavala County). In Virginia, rather than an alphabetized list of counties and cities commingled, counties appear first, in alphabetical order, followed by the independent cities, in alphabetical order (with a couple of exceptions). Specifically, the 98 counties in existence at the end of 1952 (after the disappearance of both Elizabeth City County and Warwick County in July 1952) appear at the top of the list, in alphabetical order. Next, the 30 independent cities in existence at the end of 1952 appear, in alphabetical order. This is followed by Galax city (formed/added in November 1953) and then Norton city (formed/added in January 1954). Becker (2009) contains a spreadsheet of 3,104 counties that associates the 1954-57 county codes, county names, and the county codes used in the 1963 and 1967 CMs (if the county was still in existence). In years **1958-1962**, the county code appears very similar – but not identical – to the county coding scheme used in the 1963 and 1967 CMs. Two major differences were found, involving Virginia and Wisconsin. After some investigation, and with insight from Becker (2009), it appears that the county coding scheme used here reflects the set of counties and independent cities in existence from July 1, 1958 (after Warwick County VA was eliminated) to January 1, 1960 (before South Boston city VA was formed). As such, Menominee County WI (formed on April 29, 1961) exists in the 1963/67 CM county codes but not here. Instead, take the alphabetical list of Wisconsin counties in the 1963/67 CM, eliminate Menominee County, and (re)assign codes, starting at 001, and increasing in increments of 1. In the end, all counties from Milwaukee County forward have a county code that is 1 less than that in the respective 1963/67 CM county code. For Virginia, relative to the 1963/67 CM county coding scheme, the following counties do not exist: Chesapeake city (formed on January 1, 1963), Fairfax city (formed on June 30, 1961), Franklin city (formed on December 22, 1961), and South Boston city (formed on January 1, 1960). Meanwhile, Norfolk County still existed (until January 1, 1963, when it consolidated with South Norfolk city to form Chesapeake city). Likewise, Princess Anne County still existed (until January 1, 1963, when it consolidated into Virginia Beach city). And, South Norfolk city still existed (until January 1, 1963, when it consolidated with Norfolk County to form Chesapeake city). Take the alphabetical list of Virginia counties and independent cities in the 1963/67 CM (in cases where a county has the same name as a city, the county appears first), make the above additions and subtractions, and (re)assign codes, starting at 001, and increasing in increments of 1. The following Stata code can be used to convert this county code to the one used in the 1963/67 CM (COU6367):

```
gen cou6367=cou
replace cou6367=cou+1 if state==35 & cou>=040
replace cou6367=cou+1 if state==54 & cou>=025 & cou<=037
replace cou6367=cou+2 if state==54 & cou>=038 & cou<=042
replace cou6367=cou+3 if state==54 & cou>=043 & cou<=081
replace cou6367=cou+2 if state==54 & cou>=082 & cou<=096
replace cou6367=121 if state==54 & cou==097
replace cou6367=cou+1 if state==54 & cou>=098 & cou<=110
replace cou6367=cou+2 if state==54 & cou==111
replace cou6367=025 if state==54 & cou==112
replace cou6367=cou+1 if state==54 & cou>=113
```

In years **1963-1964**, the county code appears to be identical to the county coding scheme used in the 1963 and 1967 CMs.

SMSA	Standard metropolitan statistical area code. 3-digit.
WT	Sample weight. 5-digit, with two implied decimal places. Values ranges from 0 (concentrated mainly in 1954 and 1955) to 999.9 (relatively few and all in 1958), with a median and mode of 1.00. A small percentage have no value.
WT_BINARY	Sample weight. 6-digit.
SOURCE	Source. 1-digit. Unknown.
NULL	Unknown – labeled as null in record layout. 1-digit.
PW1	Production workers during pay period ended nearest March 15th.
PW2	Production workers during pay period ended nearest May 15th.
PW3	Production workers during pay period ended nearest August 15th.
PW4	Production workers during pay period ended nearest November 15th.
TPW	Sum of PW1, PW2, PW3, and PW4.
PW	Average number of production workers. TWP divided by four.
OE	All other (non-production) workers on March 15th.
TE	Total employment. Sum of PW and OE.
WW	Production worker wages (in \$000).
OW	All other (non-production) employees salaries and wages (in \$000).
SW	Total payroll (salaries and wages) (in \$000). Sum of WW and OW.
PH1	Man-hours of production workers in January through March (in 000).
PH2	Man-hours of production workers in April through June (in 000).
PH3	Man-hours of production workers in July through September (in 000).

PH4	Man-hours of production workers in October through December (in 000).
PH	Total production worker man-hours. Sum of PH1, PH2, PH3, and PH4.
CP	Cost of materials, parts, components, containers, supplies, etc., consumed (in \$000).
CR	Cost of resales (products bought and resold without further manufacture, processing, or assembly) (in \$000).
CF	Cost of fuels consumed (in \$000).
EE	Cost of purchased electricity (in \$000).
CW	Cost of contract work done for plant by others on plant's materials (in \$000).
CM	Total cost of materials, fuels, electricity, contract work, etc. (in \$000). Sum of CP, CR, CF, EE, and CW.
FIE	Finished products inventories at end of year (in \$000).
WIE	Work-in-progress inventories at end of year (in \$000).
MIE	Materials, supplies, fuels, etc., inventories at end of year (in \$000).
TIE	Total inventories at end of year (in \$000). Sum of FIE, WIE, and MIE.
NB	New structures and additions to plant (in \$000).
NM	New machinery and new equipment (in \$000).
UE	Used plant and used equipment acquired from others (in \$000).
TCE	Total capital expenditures (in \$000). Sum of NB, NM, and UE.
PE	Purchased electricity (in 000 of kWh).
GE	Generated electricity (gross less generating station use) (in 000 of kWh).
SE	Electricity sold or transferred to other establishments (in 000 of kWh).
TVPS	Total value of products shipped (in \$000). Sum of appropriate PWV* variables.

RCW	Receipts for work or services performed by plant for others on their materials (in \$000).
MSC	Miscellaneous receipts (repair work, installation, sales of scrap, etc.) (in \$000).
VR	Sales of products bought and resold without further manufacture, processing, or assembly (in \$000). The cost of such products should be in CR.
TVS	Total value of shipments (in \$000). Sum of TVPS, RCW, MISC, and VR.
UVA	Unadjusted value added (in \$000). “The standard formula for deriving value added by manufacture in 1958 was modified from the one used for earlier censuses. During the earlier period, the measure was obtained by subtracting the cost of materials, supplies and containers, fuel, purchased electric energy, and contract work [see CM above] from the value of shipments for products manufactured plus receipts for services rendered [see TVS above]. This item is referred to as unadjusted value added.... For 1958, this measure of value added was adjusted by taking into account the following items: (a) value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacture, processing, or assembly) plus (b) the net change in finished goods and work-in-process inventories between the beginning and end of the year. The resulting figure is the adjusted value added by manufacture. ... The adjusted value added is superior because it is more comprehensive as an approximation of the net production of goods and services during the period.... Under the earlier concept, the value added in merchandising was omitted on the grounds that it did not accrue as a consequence of manufacturing functions. Under the new (adjusted) concept, the measurement of all activities of establishments defined as primarily manufacturing is accepted as the objective.” (U.S. Bureau of the Census 1961) This seems to suggest that $UVA = SUM_PC + RCW - CP - CF - EE - CW$, or $UVA = SUM_PC + RCW + MSC - CP - CF - EE - CW$.
AVA	Adjusted value added (in \$000). “The standard formula for deriving value added by manufacture in 1958 was modified from the one used for earlier censuses. During the earlier period, the measure was obtained by subtracting the cost of materials, supplies and containers, fuel, purchased electric energy, and contract work [see CM above] from the value of shipments for products manufactured plus receipts for services rendered [see TVS above]. This item is referred to as unadjusted value added.... For 1958, this measure of value added was adjusted by taking into account the following items: (a) value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacture, processing, or assembly) plus (b) the net change in finished goods and work-in-process inventories between the beginning and end of the year. The resulting figure is the adjusted value added by manufacture. ... The adjusted value added is superior because it is more comprehensive as an approximation of the net production of goods and services during the period.... Under the earlier concept, the value added in merchandising was omitted on the grounds that it did not accrue as a consequence of manufacturing functions. Under the new (adjusted) concept, the measurement of all activities of establishments defined as primarily manufacturing is accepted as the objective.” (U.S. Bureau of the Census 1961) This seems to suggest that $AVA = TVS - CM + \Delta FIE + \Delta WIE$.
PC1	Product made in the establishment. In 1954-57, the first 5 digits contain a product class code number, and the 6th digit is empty. From 1958 and on, the first 5 digits contain a product class code number, and the 6th digit contains either a 0 to indicate <i>quantity</i> or a 1 to indicate <i>value</i> .

↓ PC40	↓ (There are 40 variables to accommodate product listing.)
PQV1	In 1954-57, the value of product PC1 shipped (in \$000). From 1958 and on, if the 6th digit of PC1 contains a 0, quantity of product PC1 shipped (see instructions for unit of quantity). From 1958 and on, if the 6th digit of PC1 contains a 1, value of product PC1 shipped (in \$000).
↓ PQV40	↓ (There are 40 variables to accommodate up to 20 quantities and 20 values.)
TAE	Gross book value of buildings, structures, machinery, equipment, and other depreciable fixed assets at end of year. Only available for 1962, 1963, and 1964.
BR	Rental payments (or equivalent charges) for use of buildings and structures (in \$000). Excludes payment for land. Only available for 1963 and 1964.
MR	Rental payments (or equivalent charges) for use of transportation, production, and office equipment (in \$000). Only available for 1963 and 1964.
TRT	Retirements (in \$000). Only available for 1963 and 1964.
REPTOT57	Total expenditure for maintenance and repairs in 1957 (in \$000). Sum of REPSW57 and REPTH57. Includes own expenditures for repair materials and supplies, salaries and wages, and the cost of work done by outside contractors. Includes the costs charged to current expense accounts, such as cleaning, repair of office equipment and plant machinery, painting, repair of structures, maintenance of grounds, etc. <i>Excludes</i> expenditures which are charged to a capital account or to a depreciation reserve. Includes expenditures made on leased property or facilities owned by Government agency. From Form MC-D11.
REPSW57	Salaries and wages paid to own employees for maintenance and repair activities in 1957 (in \$000). From Form MC-D11. See also REPTOT57.
REPTH57	Other maintenance and repair costs in 1957 (in \$000). Includes purchased materials and supplies used in maintenance and repairs, and maintenance and repair services purchased from other business establishments. From Form MC-D11. See also REPTOT57.
EINS_OASI57	Employer payments for (legally required) old age and survivors insurance in 1957 (in \$000). From Form MC-D11.
EINS_UI57	Employer payments for (legally required) unemployment insurance – state and federal – in 1957 (in \$000). From Form MC-D11.
EINS_WC57	Employer payments for (legally required) workmen’s compensation premiums, and state temporary disability payments (Rhode Island, California, New York, New Jersey), in 1957 (in \$000). From Form MC-D11.

EINS_PRIVATE57	Employer payments or allocations for private pension plans, health and welfare plans, life insurance, stock purchase plans, thrift savings plans, and supplemental unemployment compensation plans, in 1957 (in \$000). See form for substantial more details. From Form MC-D11.
INS57	Insurance premiums accrued or paid to others in 1957 (in \$000). Includes insurance on structures, equipment, and inventories; liability insurance; theft insurance; window breakage; etc. Excludes insurance reported in EINS_OASI57, EINS_UI57, EINS_WC57, and EINS_PRIVATE57. From Form MC-D11.
RENT57	Rental payments to others in 1957 (in \$000). Includes payments for structures and equipment. From Form MC-D11.
TAX57	Tax payments (or charges) in 1957 on land, structures, equipment, and inventories (in \$000). Excludes all other taxes, such as income taxes, sales taxes, excise taxes, and permit fees. From Form MC-D11.
ASSETS57	Gross book value of structures, equipment, and other depreciable or depletable fixed assets on December 31, 1957 (in \$000). From Form MC-D11. The book value represents the actual cost of the assets at the time of purchase including all costs incurred in making the asset usable (such as transportation and installation).
CUMDEP57	Accumulated depreciation and depletion to December 31, 1956 (in \$000). From Form MC-D11. See Chapter 9 of U.S. Bureau of the Census (1961) for additional details and definitions.
DEP57	Depreciation and depletion charged in 1957 (in \$000). From Form MC-D11. See Chapter 9 of U.S. Bureau of the Census (1961) for additional details and definitions.
RET57	Retirements in 1957 (in \$000). From Form MC-D11. <i>Undepreciated</i> value of fixed assets retired from use.

FLAGS & OTHER

FSPLIT1	A block of flags appearing at the end of line 1 of record layout, first word. Unknown.
FSPLIT2	A block of flags appearing at the end of line 1 of record layout, second word. Unknown.
FSPLIT3	A block of flags appearing at the end of line 1 of record layout, third word. Unknown.
FLAGS2	A block of flags appearing at the end of line 3 of record layout. Unknown.
FLAGS_RA	A block of flags associated with the rent and asset variables in 1962 (TAE, BR, MR, TRT). Unknown.
CCS1	ITS CCS Code 1. 2-digit. Unknown.
CCS2	ITS CCS Code 2. 2-digit. Unknown.
CCS3	ITS CCS Code 3. 2-digit. Unknown.
CCS4	ITS CCS Code 4. 2-digit. Unknown.

CCS5	ITS CCS Code 5. 2-digit. Unknown.
CCS6	ITS CCS Code 6. 2-digit. Unknown.

FILLER1	
FILLER2	
FILLER3	
FILLER4	
FILLER5	
FILLER6	

FILE	Source file number from DSAR 79-089. 6-digit. Constructed by Becker & Grim.
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TABLE 8
Establishment Counts in the Individual ASM Files of 1954-1964
(DSAR 69-068 only)

Year	Number of Establishments		
	Total	With Positive Payroll and Employment	Published Information
1954	39,667	39,523	n/a
1955	49,325	49,113	about 45,000
1956	49,430	49,146	about 45,000
1957	47,780	47,446	about 50,000
1958	74,775	74,118	n/a
1959	61,754	58,614	about 60,000
1960	61,569	57,764	about 60,000
1961	63,156	58,035	about 60,000
1962	61,977	57,902	about 60,000
1963	63,820	62,673	n/a
1964	65,488	61,398	about 60,000

TABLE 9
Linking the ITS Files to Each Other and to Existing Longitudinal Microdata:
Preliminary Match Rates Using ID Only

Year	t – 1		t + 1		1963 CM		1967 CM	
	Unweighted	Employment-weighted	Unweighted	Employment-weighted	Unweighted	Employment-weighted	Unweighted	Employment-weighted
1954			95.4	93.7	47.7	55.9	36.9	47.3
1955	76.6	90.6	93.6	96.2	48.1	60.1	37.1	51.3
1956	93.3	96.6	93.5	97.8	50.0	62.1	38.3	52.2
1957	96.7	98.9	78.4	81.0	52.5	63.3	40.2	53.2
1958	50.5	72.0	77.7	93.4	63.0	77.9	46.5	63.2
1959	93.1	99.2	92.6	97.6	66.5	81.2	48.9	66.4
1960	92.9	97.2	93.4	96.8	70.8	84.3	51.7	69.2
1961	91.1	96.3	88.0	96.4	75.2	87.8	54.1	71.7
1962	89.9	94.8	84.5	92.7	84.7	92.5	60.4	75.2
1963	81.8	89.6	98.1	99.1	99.9	99.7	68.3	79.6
1964	95.7	98.1			96.1	97.9	69.1	81.3

TABLE 10
1954-1961 Industrial Time Series “Prototype” 25-Industry Files: Variables and Variable Definitions

Variable name	Description
ID	Establishment identification number (in 1961). 10-digit. For a plant in a multi-unit manufacturing firm, ID does not begin with 0, and the first 6 digits are identical for plants belonging to the same firm. For a single-unit plant/firm, ID begins with 0, and the 10-digit number uniquely identifies firm.
IND	1958 Standard Industrial Classification code (in 1958). 4-digit.
STATE	Census state code. 2-digit. The first digit indicates the Census division within the United States (1-9). The second digit indicates the state within the division. Not to be confused with the 2-digit FIPS state code (introduced in 1970). Among the states that do not appear here are DC, South Dakota, and Vermont; Alaska and Hawaii did not become states until 1959. Invalid codes that appear include ‘ 2’ – which appears it might actually be Hawaii (based on ID match with 1963 CM).
COU	<p>County code. 3-digit. This county code appears very similar – but not identical – to the county coding scheme used in the 1963 and 1967 Census of Manufactures. Two major differences were found, involving Virginia and Wisconsin. After some investigation, and with insight from Becker (2009), it appears that the county coding scheme used here reflects the set of counties and independent cities in existence from July 1, 1958 (after Warwick County VA was eliminated) to January 1, 1960 (before South Boston city VA was formed). As such, Menominee County WI (formed on April 29, 1961) exists in the 1963/67 CM county codes but not here. Instead, take the alphabetical list of Wisconsin counties in the 1963/67 CM, eliminate Menominee County, and (re)assign codes, starting at 001, and increasing in increments of 1. In the end, all counties from Milwaukee County forward have a county code that is 1 less than that in the respective 1963/67 CM county code. For Virginia, relative to the 1963/67 CM county coding scheme, the following counties do not exist: Chesapeake city (formed on January 1, 1963), Fairfax city (formed on June 30, 1961), Franklin city (formed on December 22, 1961), and South Boston city (formed on January 1, 1960). Meanwhile, Norfolk County still existed (until January 1, 1963, when it consolidated with South Norfolk city to form Chesapeake city). Likewise, Princess Anne County still existed (until January 1, 1963, when it consolidated into Virginia Beach city). And, South Norfolk city still existed (until January 1, 1963, when it consolidated with Norfolk County to form Chesapeake city). Take the alphabetical list of Virginia counties and independent cities in the 1963/67 CM (in cases where a county has the same name as a city, the county appears first), make the above additions and subtractions, and (re)assign codes, starting at 001, and increasing in increments of 1. The following Stata code can be used to convert this county code to the one used in the 1963/67 CM (COU6367):</p> <pre> gen cou6367=cou replace cou6367=cou+1 if state==35 & cou>=040 replace cou6367=cou+1 if state==54 & cou>=025 & cou<=037 replace cou6367=cou+2 if state==54 & cou>=038 & cou<=042 replace cou6367=cou+3 if state==54 & cou>=043 & cou<=080 replace cou6367=025 if state==54 & cou==081 </pre>

```

replace cou6367=cou+2 if state==54 & cou>=082 & cou<=096
replace cou6367=121   if state==54 & cou==097
replace cou6367=cou+1 if state==54 & cou>=098 & cou<=110
replace cou6367=025   if state==54 & cou==111
replace cou6367=cou+1 if state==54 & cou>=112

```

INV53	Work-in-process inventories plus finished product inventories (end of 1953). See also INV.
ENERGY61	Costs of fuels plus electricity (1961).
ENERGY54	Costs of fuels plus electricity (1954).
HP54	Horsepower of power equipment (1954). From the 1954 Census of Manufactures. Short forms in 1954 did not include the horsepower inquiry. See U.S. Bureau of the Census (1957) for additional details and definitions.
EINS_TOTAL57	Selected supplementary employee costs (1957). From Form MC-D11. Conklin (1964) labels this “payments for employee pension and insurance plans” and the record layout labels this “Emp. pens. & ins. pmts”. This looks to us to be the sum of selected supplementary employee costs, including (a) employer payments for the following legally required insurance plans: (i) old-age and survivors insurance, (ii) unemployment insurance (state and federal), and (iii) workmen’s compensation premiums and selected state temporary disability payments, plus (b) other employer payments or allocations, including those to private pension plans, health plans, life insurance, stock purchase plans, and similar. See Chapter 9 of U.S. Bureau of the Census (1961) for additional details and definitions.
INS_TAX_57	Insurance premiums and property taxes (1957). From Form MC-D11. Conklin (1964) labels this “insurance and taxes” and the record layout labels this “Ins. & taxes”. This looks to us to be the sum of (a) insurance premiums accrues or paid to others (all types of insurance on structures, equipment, inventories, liability, theft, etc.), plus (b) property tax payments paid on land, structures, equipment, and inventories. See Chapter 9 of U.S. Bureau of the Census (1961) for additional details and definitions.
ASSETS57	Gross book value of of depreciable or depletable assets (December 31, 1957). From Form MC-D11. The data encompasses all fixed depreciable or depletable assets on the books of the establishment at the end of 1957. The book value represents the actual cost of the assets at the time of purchase including all costs incurred in making the asset usable (such as transportation and installation).
CUMDEP57	Accumulated depreciation and depletion (to December 31, 1956). From Form MC-D11. See Chapter 9 of U.S. Bureau of the Census (1961) for additional details and definitions.
DEP57	Depreciation and depletion (charged in 1957). From Form MC-D11. See Chapter 9 of U.S. Bureau of the Census (1961) for additional details and definitions.
RET57	Retirements (1957). From Form MC-D11. <i>Undepreciated</i> value of fixed assets retired from use.

ANNUAL VARIABLES (1954-1961)

YEAR	Year. 2-digit.
WW	Production worker wages. See also SW and PW.
SW	Total payroll. Total salaries and wages paid to all employees. "It includes all forms of compensation such as salaries, wages, commissions, dismissal pay, all bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees' Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds.... It should be noted that this definition does not include employers' Social Security contributions, or other nonpayroll labor costs such as employees' pension plans, group insurance premiums, and workmen's compensation."
PW	Production workers. Average number of production workers during the four pay periods ending nearest the 15th of March, May, August, and November. "Workers (up through the working foreman level) engaged in fabricating, processing, assembling, inspection, receiving, storage, handling, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, watchman services, product development, auxiliary production for plants' own use (e.g., power plant), record keeping, and other services closely associated with these production operations." See also TE.
TE	Total employees. Production workers (as defined in PW) plus all other employees on March 15th. "Comprises all full-time and part-time employees.... Included are all persons on paid sick leave, paid holidays, and paid vacations during these pay periods. Excluded are members of the armed forces and pensioners carried on the active rolls but not working during the period. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are, however, excluded from the total... Nonproduction personnel ... [include] those engaged in the following activities: factory supervision above the working foreman level, sales (including driver salesmen), sales delivery (highway truck drivers and their helpers), advertising, credit, collection, installation and servicing of own products, clerical and routine office functions, executive, purchasing, financing, legal, personnel (including cafeteria, medical, etc.), professional, and technical. Also included are employees on the payroll ... engaged in the construction of major additions or alterations to the plant and who are utilized as a separate workforce." See also PW.
PHMAX	Peak quarter man-hours. Maximum of the four quarterly total production worker man-hours. See also PH.
PH	Total production worker man-hours. "It represents all man-hours worked or paid for ... including actual overtime hours.... It excludes hours paid for vacations, holidays, or sick leave..." See also PW.
CM	Total cost of materials, fuels, electricity, resales, and contract work. Includes "(a) the total delivered cost of all raw materials, semifinished goods, parts, components, containers, scrap, and supplies put into production in [the year] or used as operating supplies and for repair and maintenance during that year; (b) the amount paid for electric energy purchased; (c) the amount paid for all fuels consumed for heat, power, or the generation of electricity; (d) the cost of work done by others on materials or parts furnished by manufacturing establishments; (e) cost of products bought and resold in the same condition. The total excludes the cost of services used, such as advertising, insurance, telephone, etc., and research, developmental, and consulting services of other establishments; it

also excludes overhead costs, such as depreciation charges, rent, interest, royalties, etc.; it excludes materials, machinery and equipment used in plant expansion or capitalized repairs which are chargeable to fixed assets accounts.”

INV	Work-in-process inventories plus finished product inventories (end of year). See also INV53.
NB	Capital expenditures on new structures and additions to plant. See also TCE.
TCE	Total capital expenditures. “Expenditures made during the year for permanent additions and major alterations to [the plant], as well as for new machinery and equipment purchases, that were chargeable to fixed-asset accounts... and were of a type for which depreciation accounts are ordinarily maintained. Expenditures for machinery and equipment were to include those made for replacement purposes, as well as for additions to plant capacity. Excluded ... are costs of maintenance and repairs charged as current operating expense. Also excluded are expenditures for land and expenditures made by owners of plants and equipment leased to reporting manufacturers.” See also NB.
TVS	Total value of shipments. “...the received or receivable net selling values, f.o.b. plant, after discounts and allowances, and excluding freight charges and excise taxes. However, where the products of an industry are customarily delivered by the manufacturing establishments ... the value of shipments is based on the delivered price of the goods rather than the f.o.b. plant price.... [I]nclude all items made by or for each establishment from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. Also included were receipts for contract work and for such miscellaneous activities as sale of scrap and refuse, installation work by manufacturing plant employees, research and development work, and repair work. The net selling value of products made in one plant on a contract basis from materials owned by others was reported by the plant providing the materials. ... In the case of multiunit companies, the manufacturer was requested to report the value of precuts transferred to other establishments of the same company ... (at ‘the nearest approximation to corresponding commercial values, f.o.b. plant, and not the cost of production.”
VA_ADJ	Adjusted value added. “The standard formula for deriving value added by manufacture in 1958 was modified from the one used for earlier censuses. During the earlier period, the measure was obtained by subtracting the cost of materials, supplies and containers, fuel, purchased electric energy, and contract work [see CM above] from the value of shipments for products manufactured plus receipts for services rendered [see TVS above]. This item is referred to as unadjusted value added.... For 1958, this measure of value added was adjusted by taking into account the following items: (a) value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacture, processing, or assembly) plus (b) the net change in finished goods and work-in-process inventories between the beginning and end of the year. The resulting figure is the adjusted value added by manufacture. ... The adjusted value added is superior because it is more comprehensive as an approximation of the net production of goods and services during the period.... Under the earlier concept, the value added in merchandising was omitted on the grounds that it did not accrue as a consequence of manufacturing functions. Under the new (adjusted) concept, the measurement of all activities of establishments defined as primarily manufacturing is accepted as the objective.” This seems to suggest that $VA_ADJ = TVS - CM + \Delta INV$.
COSTS	CM+SW. Derived, not collected.

SPEC58	Definition appears to vary by file. In the MEND file, this appears to be the 5th digit of the plant's primary product in 1958, which is also the definition that appears on the record layout. In the FIRSTA file, this appears to be the 5th digit of the plant's primary product <i>in that year</i> (which can obviously be different than the primary product in 1958). This alternate definition was discovered through inspection of a small sample of completed survey forms (available on microfilm) for cases with discrepancies in SPEC58 between FIRSTA and MEND.
SPEC	Approximate percentage of TVS accounted for by product indicated by SPEC58. 1-digit. For example, 7 indicates a range of 70-80%.

PRODUCT CLASS DATA FOR 1961

Variable names will vary by industry. See Attachment A of record layout. In short, value of shipments is available for all the primary products of a plant's industry and selected secondary products, for year 1961.

OTHER

SEQ_TYPE1	Sequence number, Type 1 file.
SEQ_TYPE2	Sequence number, Type 2 file.

FLAGS (TS54E only)

BIRTHYEAR	Birth year. 2-digit.
DEATHYEAR	Death year. 2-digit.
FLAG_VA	See record layout for five possible values. 1-digit.
FLAG_CE_GBV	See record layout for two possible values. 1-digit.
FLAG_DEP_GBV	See record layout for two possible values. 1-digit.
FLAG_HP	HP54: reported, estimated, partially estimated. 1-digit.
FLAG_SUPP	SUPPCOSTS57: reported, estimated, partially estimated. 1-digit.
FLAG_INS_TAX	INS_TAX_57: reported, estimated, partially estimated. 1-digit.
FLAG_ASSETS	ASSETS57: reported, estimated, partially estimated. 1-digit.
FLAG_54	Report, estimated, partially estimated. 1-digit.
↓	↓
FLAG_63	Report, estimated, partially estimated. 1-digit.

CONSTRUCTED VARIABLES (TS54E only)

SC57	Supplemental costs (1957). Derived, not collected. Appears to be SUPPCOSTS57 + INS_TAX_57, except when it is not.
SUM_COSTS	Operating costs (1957). Derived, not collected. Appears to be SC57 + CM (in 1957) + SW (in 1957), except when it is not.
SUMCE54_57	Appears to be the sum of TCE from 1954-1957.
SUMCE_ASSETS	Appears to be SUMCE54_57 divided by ASSETS57.

TABLE 11
Basic Information on the Three ITS Prototype Files

Filename	Number of observations	Number of variables	Number of industries	Number of unique IDs	Number of unique ID-YEARs
FIRSTA	14,464	32	25	1,808	14,463
MEND	14,456	32	25	1,807	14,456
TS54E	16,404	55	25	1,807	14,456

TABLE 12
Industrial Composition of the ITS Prototype Sample

1958 SIC code	Industry	N	Number of establishments in 1958 Census of Manufactures	
			Total	With 20 or more employees
2092	Soybean oil mills	68	117	83
2271	Woven carpets and rugs	31	69	47
2272	Tufted carpets and rugs	60	92	72
2822	Synthetic rubber	20	18	17
2823	Cellulosic man-made fibers	26	26	26
2824	Organic fibers, noncellulosic	17	14	14
2911	Petroleum refining	267	446	313
3011	Tires and inner tubes	69	123	86
3241	Hydraulic cement	172	175	170
3312	Blast furnaces and steel mills	253	291	260
3313	Electrometallurgical products	32	37	35
3315	Steel wire drawing	67	170	103
3322	Malleable iron foundries	60	82	74
3323	Steel foundries	150	256	216
3331	Primary copper	30	30	29
3332	Primary lead	13	13	13
3333	Primary zinc	20	20	20
3334	Primary aluminum	23	20	20
3351	Copper rolling and drawing	74	105	89
3352	Aluminum rolling and drawing	88	185	129
3362	Brass, bronze, copper castings	47	665	209
3391	Iron and steel forgings	102	301	189
3392	Nonferrous forgings	16	29	20
3519	Internal combustion engines	52	112	75
3612	Transformers	51	175	82
		=====	=====	=====
		1,808	3,571	2,391

Source: Number of establishment in 1958 are taken from U.S. Bureau of the Census, *U.S. Census of Manufactures: 1958, Vol. 1, Summary Statistics*. Washington, DC: U.S. Government Printing Office, 1961.

TABLE 13
ITS Prototype Sample Coverage in 1958 Relative to 1958 Census of Manufactures Universe

1958 SIC code	Industry	Number of "active" establishments	Value of shipments	Total employees	Capital expenditures
2092	Soybean oil mills	56%	90%	87%	86%
2271	Woven carpets and rugs	45%	98%	96%	99%
2272	Tufted carpets and rugs	61%	91%	96%	93%
2822	Synthetic rubber	106%	103%	103%	101%
2823	Cellulosic man-made fibers	100%	~100%	~100%	100%
2824	Organic fibers, noncellulosic	93%	~100%	100%	117%
2911	Petroleum refining	56%	94%	93%	97%
3011	Tires and inner tubes	52%	99%	99%	99%
3241	Hydraulic cement	95%	99%	98%	111%
3312	Blast furnaces and steel mills	85%	(a)	~100%	~100%
3313	Electrometallurgical products	84%	98%	97%	98%
3315	Steel wire drawing	38%	86%	84%	86%
3322	Malleable iron foundries	72%	83%	85%	78%
3323	Steel foundries	58%	92%	91%	96%
3331	Primary copper	97%	(a)	101%	97%
3332	Primary lead	100%	(a)	~100%	116%
3333	Primary zinc	100%	~100%	100%	100%
3334	Primary aluminum	100%	101%	~100%	78%
3351	Copper rolling and drawing	69%	98%	99%	113%
3352	Aluminum rolling and drawing	44%	95%	94%	110%
3362	Brass, bronze, copper castings	7%	41%	36%	31%
3391	Iron and steel forgings	34%	87%	87%	79%
3392	Nonferrous forgings	55%	101%	99%	99%
3519	Internal combustion engines	46%	95%	94%	99%
3612	Transformers	26%	94%	92%	248%

Source: Underlying statistics on the 1958 universe are taken from U.S. Bureau of the Census, *U.S. Census of Manufactures: 1958, Vol. 1, Summary Statistics*. Washington, DC: U.S. Government Printing Office, 1961.

^(a) The total value of shipments for these three industries were not published due to the extensive duplication arising from shipments from one establishment to another in the same industry.

TABLE 14
Share of U.S. Manufacturing Activity in 1958

	Number of establishments	Adjusted value added	Total employees	Capital expenditures	Gross book value of depreciable assets
ITS Prototype sample (N=1,808)	0.61%	10.49%	7.94%	24.0%	26.0%
25 industries in scope to ITS Prototype	1.20%	10.85%	8.26%	24.1%	(a)

Source: Underlying statistics on the 1958 universe are taken from U.S. Bureau of the Census, *U.S. Census of Manufactures: 1958, Vol. 1, Summary Statistics*. Washington, DC: U.S. Government Printing Office, 1961.

^(a) Published statistics on gross book value of depreciable assets employ the industry classification system in place before the 1958 Standard Industrial Classification scheme.

TABLE 15
Establishment Counts in the Individual ASM Files of 1953-1956

Year	Number of Establishments		
	Total	With Positive Payroll and Employment	Published Information
1953	23,804	23,722	52,000
1954	-	37,788*	n/a
1955	39,471	37,875	about 45,000
1956	45,909	44,467	about 45,000

* The count shown is the number of establishments in the 1955 file with positive values of prior year payroll and employment.

FIGURE 1
Newly Recovered and Existing Microdata on Manufacturers

APPENDIX A
An Attempt to Summarize the Recovered Historical Economic Microdata

Here, we highlight some of the business microdata that were recovered from the Unisys Clearpath mainframe. Note that it is very difficult to summarize this information succinctly, for a variety of reasons, not the least of which is that there are thousands of files, many with only a crude description (if any at all) in the associated paper file (*data storage action request*). It should also be noted that presence on the list below does not necessarily guarantee that there are usable microdata files. And, in some cases, the lack of a record layout may make recovered data very difficult to use – unless related data and/or record layouts exist. Further details are available upon request. Meanwhile, for the list of surveys and years that CES *currently* has and makes available, see <http://www.census.gov/ces/dataproducts/>.

Manufacturing and Mining

Census of Manufactures	
Special inquiries data	1967, 1972, 1977, 1982
Class of customer data	1967, 1977
CAO (auxiliary establishments)	1977
MA-131 (Supplemental Survey of Materials Consumed)	1972
Location of plants	1963
Ancillary data (e.g., flags, name and address, edit parameters)	1967, 1972, 1977, 1982
Census of Manufactures (Puerto Rico)	1967, 1972, 1977
Census of Mining	1963, 1967, 1972, 1977, 1982
Annual Survey of Manufactures	
Main files	1953-1964, 1966-1971
ITS (longitudinally-linked ASM estabs)	1954-1961
CAO (auxiliary establishments)	1974, 1977-81, 1983-86, 1988-91
Fixed Base Difference files	1974, 1978-85, 1989, 1991
MA-175 (Defense, Government)	1981-84
Defense Mobilization	1987, 1989
Ancillary data (flags, parameters, sampling universes, etc.)	Various years
Name and address files	Various years
Fuel and Electric Energy supplement	1974, 1976
MA-452 (Survey of the Consumption of Selected Hydrocarbon, Coal, and Coke Materials)	1978-80
Survey of Water Use in Manufacturing	1973, 1978, 1983
Capital Asset and Depreciation Survey	
Survey of Industrial R&D	1967-70
Survey of Plant Capacity	1973-88 (additional data and flags)
Pollution Abatement Costs and Expend. Survey	1980, 1983/84
Zvi Griliches project files (includes R&D, CM)	1957-1980
Lawrence Klein project data	
Ruggles project files	1954-59, 1972-81
Annual Survey of Oil and Gas	1974-82

Business (i.e., non-manufacturing)

Census of Business	1972
Census of Retail (various)	1963, 1967(Puerto Rico), 1972(Capital Expenditure)
Census of Wholesale	1958, 1963, 1967

Census of Services	1963, 1967, 1967(Lawyers), 1967(Capt Exp Med Assets)
Service and Retail Capital Expenditure Survey	1972
Annual Retail Trade Survey	1974, 1979-81, 1984-86, 1990
Annual Trade Survey	1980, 1982-87, 1990
Services Annual Survey	1987, 1990
Annual Wholesale Trade Survey (WATS)	1989-90
Heating Fuel Survey	1979-80
Survey of Gallonage Sales of Gasoline	1980-82
Canned Food Survey	1981
International Trade	
Imports (transactions)	1989-90
Business Register	
SSEL files (various)	1974-87, 1989
County Business Patterns establishment files	1976-84
Other administrative records files	1977-82
Enterprise Statistics	1972, 1977
Non-employers	
Survey of Minority-owned Business Enterprises	1972, 1977, 1982, 1987
Outlying Areas	
Economic Census	1982
Puerto Rico	
Census of Retail	1967
Census of Manufactures	1967, 1972, 1977
Census of Construction	1977
Transportation	
Commodity Transport Survey	
(now Commodity Flow Survey)	1967, 1972, 1977
Domestic and International Transportation	
of U.S. Foreign Trade	1976
DOT Final GAT-1 and PUT-1	
Truck Inventory and Use Survey (public use?)	1977
Construction	
Building Permits	1970-86, 1989
Survey of Housing Starts, Sales,	1979-83
and Completions (HSS)	
Progress Reporting	1973-83
Agriculture	
Census of Agriculture	1964, 1969, 1974, 1978 (+ “Farm Real Estate Survey” and “Hired Labor”)
Census of Agriculture - Puerto Rico	1969, 1978, 1982
Census of Agriculture - Guam, Virgin Islands	1982
Census of Agricultural Services	1969, 1978
Farm Finance Survey	1969 (or 1974?), 1978, 1979(Landlords; Operators)
Census of Commercial Fisheries	1967
Census of Irrigation	1969
Census of Horticulture	1979

APPENDIX B **The 1966 Annual Survey of Manufactures Form**

FORM MA-100 (9-22-65)		U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		Budget Bureau No. 41-R-1256.15; Approval Expires December 31, 1969	
ANNUAL SURVEY OF MANUFACTURES				TAB	V
PLEASE COMPLETE EVERY ITEM TO AVOID CORRESPONDENCE BE SURE TO READ INSTRUCTION MANUAL BEFORE COMPLETING REPORT				IND-C	2
ITEM 1 - PHYSICAL LOCATION OF ESTABLISHMENT (Give actual location, not mailing address)				IND-T	3
Address				AREA	4
City				INFL	5
County				S	6
State				PPN	7
(Please correct if mailing address has changed)					
COMPLETE EVERY ITEM (Enter "0" when appropriate)				1963	1964
ITEM 2 - NUMBER OF EMPLOYEES				1965	1966
Number of production workers during pay period which includes the 12th of the month					
a. March					
b. May					
c. August					
d. November					
e. Sum of lines a - d					
f. AVERAGE NUMBER (Divide sum on line e by 4 - omit fractions and decimals)					
g. All other employees during the pay period which includes the 12th of March					
h. TOTAL NUMBER OF EMPLOYEES (Sum of lines f and g)					
IMPORTANT: Report items 3-5, and 11-12 in thousands (Example: if total payroll is \$215,166, enter #215)					
ITEM 3 - PAYROLLS (\$000)					
a. Production workers' wages					
b. All other employees' salaries and wages					
c. TOTAL PAYROLLS					
ITEM 4 - PLANT MAN-HOURS OF PRODUCTION WORKERS, BY QUARTER (\$000)					
a. January through March					
b. April through June					
c. July through September					
d. October through December					
e. TOTAL PRODUCTION WORKERS' MAN-HOURS (Sum of lines a - d)					
ITEM 5 - COST OF MATERIALS, FUELS, ELECTRICITY, CONTRACT WORK (\$000)					
a. Cost of materials, parts, components, containers, etc., consumed					
b. Cost of products bought and resold as such					
c. Cost of fuels consumed					
d. Cost of purchased electricity					
e. Cost of contract work done for you by others on your materials					
f. TOTAL COST (Sum of lines a - e)					
ITEM 6 - INVENTORIES OF THIS ESTABLISHMENT AT END OF YEAR (\$000)					
a. Finished products inventories					
b. Work-in-process inventories					
c. Materials, supplies, fuels, etc., inventories					
d. TOTAL INVENTORIES, END OF YEAR (Sum of lines a - c)					
ITEM 7 - CAPITAL EXPENDITURES DURING YEAR (Exclude land) (\$000)					
a. New structures and additions to this plant					
b. New machinery and new equipment					
c. Used plant and used equipment acquired from others					
d. TOTAL CAPITAL EXPENDITURES (Sum of lines a - c)					
ITEM 8 - QUANTITY OF ELECTRICITY (Thous. of KWH)					
a. Purchased electricity (for which cost is reported in 5d)					
b. Generated electricity (gross less generating station use)					
c. Electricity sold or transferred to other establishments					
ITEM 9 - VALUE OF PRODUCTS SHIPPED AND OTHER RECEIPTS (\$000)					
Product classes of this establishment (If printed descriptions are not correct, please revise. Describe all additional products.)				Product class code (See manual)	5
a.				1963	1964
b.				1965	1966
c.					
d.					
e.					
f.					
g.					
h. Insert total value of shipments reported in item 9A on reverse side.					
i. Receipts for work or services performed by you for others on their materials (Describe)				93000	
j. Miscellaneous receipts (Repair work, installation, sales of scrap, etc.) (Describe)				99900	
k. Sales of products bought and resold without further manufacture, processing, or assembly. (Report cost in item 5k)				99909	
l. TOTAL (Sum of values in lines a - k)				77000	
ITEM 10 - QUANTITY OF PRODUCTS SHIPPED (If additional lines are needed, use item 9A on reverse side.)				Unit of quantity	Product class code
a.				1963	1964
b.				1965	1966
c.					
d.					
ITEM 11 - a. GROSS BOOK VALUE FIXED ASSETS (As of end of year - original cost)				1963	1964
1. Buildings and other structures (exclude land)					
2. Machinery and equipment (Include production, office, transportation equipment)					
3. TOTAL GROSS BOOK VALUE OF FIXED ASSETS (Sum of lines 1 and 2)					
b. RENTAL PAYMENTS (or equivalent) (\$000)					
1. For use of buildings and structures (exclude payment for land)					
2. For use of transportation, production, and office equipment by this establishment.					

APPENDIX B (cont.)

ITEM 9A - VALUE OF PRODUCTS SHIPPED AND OTHER RECEIPTS (\$000) (Continued from Item 9)	Additional product classes of this establishment (Describe)		Product class code (See manual) 5	1963	1964	1965	1966	
	a. _____							
	b. _____							
	c. _____							
	d. _____							
	e. TOTAL (Transfer to item 9, line h) →							
ITEM 12 - SUPPLEMEN- TAL LABOR COSTS NOT INCLUDED IN PAYROLLS (Item 3c) (\$000)	See instruction manual for details						1965	1966
	a. Legally required expenditures							
ITEM 13 - FEDERAL SOCIAL SECURITY IDENTIFICA- TION NUMBER AND CHANGE IN PHYSICAL LOCATION OF ESTABLISH- MENT (FACTORY OR MILL); COMPANY ORGANIZA- TION; AND CHANGES IN OWNERSHIP OR OPERATION OF ESTABLISH- MENT	FEDERAL SOCIAL SECURITY IDENTIFICATION NUMBER AS SHOWN ON EMPLOYER'S QUARTERLY FEDERAL TAX RETURN, TREASURY FORM 941. The Census Bureau uses this number to control mailing and receipt of report forms. To avoid receiving duplicate report forms, please report any change in this number since January 1, 1963.							
	1963 ☐ Unchanged ☐ New: _____		1964 ☐ Unchanged ☐ New: _____		1965 ☐ Unchanged ☐ New: _____		1966 ☐ Unchanged ☐ New: _____	
	Please check the appropriate box.							
	a. Did the physical location of the establishment change since 1963? (If "Yes," please report the new location in item 15)							
	b. 1. Does the company operate more than one manufacturing location?							
	2. Did the company have any plants under construction but not yet in operation?							
	c. Changes in ownership or operation of this establishment since 1963?							
	1. Purchased (Enter date, name, and address of former owner in item 15)							
	2. Sold (Enter date, name, and address of purchaser in item 15)							
	3. Discontinued operations (Specify date in item 15)							
ITEM 14 - CHECKS TO ASSURE A COMPLETE AND ACCURATE REPORT	The Census Bureau reviews your report for omissions, inconsistencies, and unusual ratios. To save you future correspondence about these problems, please make the following checks before returning your report: (a) Review the report carefully to see that no items are omitted for the year being covered. (b) Calculate the four "reasonableness" checks described below, entering the figures for each, and review the results. (c) Correct your report for any errors you find; explain unusual figures in item 15.							
	"Reasonableness" checks		Calculation required for each check		Resulting figures for the year --			
	1. Average hourly wages per production worker		Item 3a (Production workers' wages) ÷ Item 4e (Total man-hours)		1965		1966	
	2. Hours worked per year per production worker		Item 4e (Total man-hours) ÷ 1000 ÷ Item 2f (Average number of production workers)		Hrs.		Hrs.	
	3. Salaries and wages per dollar of shipments		Item 3c (Total payroll) ÷ Item 9f (Total value of shipments)		¢		¢	
	4. Materials cost per dollar of shipments		Item 5f (Total materials cost) ÷ Item 9f (Total value of shipments)		¢		¢	
	5. Is the total for value of shipments (item 9f) greater than the sum for payroll (item 3c) plus total cost of materials, etc., (item 5f)? ☐ Yes ☐ No (If "No," please explain in item 15)							
	ITEM 15 - REMARKS PERTAINING TO THE REPORT FOR THE SPECIFIED YEAR	1965						
		1966						
ITEM 16 - CERTIFICA- TION	Name of person to contact if questions arise regarding this report			Address (Revise when necessary)		Telephone (incl. area code, no., ext.)		
	CERTIFICATION - This report is substantially accurate and has been prepared in accordance with instructions.							
	Period covered		Signature of authorized person		Title		Date	
	1965 → From _____ To _____							
1966 → From _____ To _____								

FORM MA-100 (10-28-68)

APPENDIX C **The 1970/71 Annual Survey of Manufactures Form**

O.M.B. No. 41R-2611; Approval Expires November 30, 1973

PENALTIES FOR FAILURE TO REPORT **DUE DATE:** _____

FORM MA-100
(7-71)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

ANNUAL SURVEY OF MANUFACTURES

1 2 3 4 5 6 7 8 X-5 1 2 3 4 5 6 7 8 X-6*

RETURN THIS COPY TO: Bureau of the Census
Jeffersonville, Indiana 47130

ITEM 1 Physical location and Employer identification Number

a. Is this establishment still located in the State, county, and place shown below? (If blank or incomplete, please complete lines (1) through (5).)
☐ Yes - Skip to part b ☐ No - Correct or complete lines (1) through (5)

(1) Number and street _____
(2) City, village, or other place _____ State _____ ZIP code _____
(3) County _____ (4) If you corrected lines 1, 2, or 3, give year moved to new location _____ IS _____
(5) Is this establishment physically located within the boundaries of the city, village, or other place?
☐ Yes ☐ No

b. Is the Employer Identification (EI) Number printed in the address box the SAME as that used for this establishment on your latest Employer's Quarterly Federal Tax Return, Treasury Form 941?
☐ Yes ☐ No - Enter currently assigned EI No. here _____

(Please correct any error in name and address including ZIP code)

Be sure to read Instruction Manual before completing report. Report items 3 - 11 in THOUSANDS (Example: If total payroll is \$215,166, enter \$215)

Complete each item, enter "0" when appropriate		a.	b.	Key	Complete each item, enter "0" when appropriate		a.	b.	Key
ITEM 2 Number of Employees	a. March			0-1	ITEM 6 Inventories of this establishment at end of year (\$000)	a. Finished products	3-1		3-3
	b. May			0-2		b. Work-in-process	3-2		3-6
	c. August			0-3		c. Materials, supplies, tools, etc.	3-3		3-7
	d. November			0-4		d. TOTAL (Item 6)	3-4		3-8
	e. Sum of lines a - d			0-5					
	f. Average number (Divide line e by d, omit fractions)			0-6					
ITEM 3A Payrolls (\$000)	a. Production workers' wages			0-7	ITEM 7 Capital expenditures during year (Exclude land) (\$000)	a. New structures and additions to this plant (Exclude land)			4-1
	b. All other salaries and wages			0-8*		b. New machinery and equipment			4-2
	c. TOTAL (Item 3A)			1-1		c. Used plant and equipment			4-3
ITEM 3B Suppl. labor costs not incl. in payroll (\$000)	a. Legally required expenditures, incl. Social Security contributions			1-2	ITEM 8 Quantity of electricity (Thousands of KWH)	a. Purchased electricity (cost is reported in 5d)			4-4
	b. Payments for voluntary programs			1-3		b. Generated electricity (gross less generating station use)			4-5
	c. TOTAL (Item 3B)			1-4		c. Electricity sold or transferred to other establishments			4-6
ITEM 4 Plant man-hours of production workers by quarter (000)	a. January through March			1-5	ITEM 10 Gross value of depreciable assets (original cost, end of year) (\$000)	a. Buildings and other structures (Exclude land)			5-X
	b. April through June			1-6		b. Machinery and equipment			5-2
	c. July through September			1-7		c. TOTAL (Item 10)			5-3
	d. October through December			1-8*					
ITEM 5 Cost of materials (\$000) <i>Include delivery cost</i>	a. Materials, parts, components, containers, etc., consumed			2-1	ITEM 11 Rental payments (\$000) <i>See manual</i>	a. Buildings and other structures (Exclude land)			5-4
	b. Products bought and resold as such			2-2		b. Machinery and equipment			5-5
	c. Fuels consumed (See also Item 12)			2-3		c. TOTAL (Item 11)			5-6
	d. Purchased electricity			2-4					
	e. Contract work done for you by others on your materials			2-5					
f. TOTAL (Item 5)			2-6*						

ITEM 9 - Quantity and value of products shipped and other receipts

Product classes of this establishment If printed descriptions are incorrect, please revise. Describe all additional products. If more lines are needed, use "Remarks" section on page 2. (a)	Product class code (See manual) (b)	Unit of quantity (c)	Quantity		Value (\$000)	
			(d)	(e)	(f)	(g)
a.						
b.						
c.						
d.						
e.						
f.						
g.						
h.						
i.						
j.						
k.						
l. Enter TOTAL products from page 2, "Remarks" section						
m. Receipts for work or services you performed for others on their materials - Describe	930008					
n. Miscellaneous receipts (repair work, installation, sales of scrap, etc.) - Describe	999805					
o. Sales of products bought and resold without further manufacture, processing, or assembly (Report cost in item 5d)	999896					
p. TOTAL (Item 9)	770008					

Please Continue on Reverse Side

APPENDIX C (cont.)

ITEM 12 Purchased fuels used in 1971 - (See instruction sheet)		Line number	Kind of fuel (a)	Code (b)	Unit of measure for quantities (c)	Quantity (d)	Cost, including delivery cost (freight-in) (\$000) (e)	Unit cost calculation	
							Calculated unit cost (f)	Usual range of average unit costs (g)	
1	Coal	121095 3	Short ton				per ton	\$ 6 - 20 per ton	
2	Coke	331212 1	Short ton				per ton	\$15 - 35 per ton	
3	Fuel Oil, Distillate	291141 0	Bbl. (42 gal.)				per bbl.	\$ 4 - 7 per bbl.	
4	Residual	291151 9	Bbl. (42 gal.)				per bbl.	\$ 3 - 6 per bbl.	
5	Natural Gas	131300 6	1,000 cu. ft.				per MCF	\$0.20 - 1.00 per MCF	
6	Other Fuels (Specify kind)	960011 5							
TOTAL COST OF FUELS (Should equal cost shown in Item 5c, page 1)									
ITEM 13 Changes in operator or operations during survey year									
Mark one box ☐ No change in operator or operations ☐ Reorganized - Describe in "Remarks," e.g., partnership change or change in corporate status. ☐ Started new business - Date _____ ☐ This establishment was purchased or leased from another company - Complete the following information:									
Name of former operator or owner				Address (Number, street, city, State, ZIP code)				EI Number (9 digits) _____ Date _____	
☐ This establishment was sold or leased to another company - Complete the following information:									
Name of new operator or owner				Address (Number, street, city, State, ZIP code)				EI Number (9 digits) _____ Date _____	
ITEM 14 NOTE: Is the FIRST DIGIT of your Census File Number (imprinted in the address box) a Zero "0"? ☐ Yes - Complete item 14A, a through d ☐ No - Skip to "Checks" below									
ITEM 14A Company affiliation and organization									
a. Is this company owned or controlled by another company? ☐ Yes - Complete the following information ☐ No									
Name, address, and Employer Identification Number of owning or controlling company				Activity of owning or controlling company (Describe, e.g., manufacturing, retail, wholesale, etc., and chief products sold)					
Employer Identification Number _____									
b. Does this company own or control any other companies? ☐ Yes ☐ No c. Does this company operate more than one establishment? ☐ Yes ☐ No d. Did this company have any manufacturing plants under construction but not in operation at the end of the year? ☐ Yes ☐ No									
ITEM 14B Other companies owned or establishments operated									
Name, address, and Employer Identification Number				Activity (Describe, e.g., manufacturing, retail, wholesale, etc., and chief products sold)				Survey year payroll and sales (\$000)	
Employer Identification No. _____								Payroll \$ _____ Sales \$ _____ Payroll \$ _____ Sales \$ _____	
ITEM 15 Not applicable this year									
CHECKS to assure a complete and accurate report									
The Census Bureau reviews your report for omissions, inconsistencies, and unusual ratios. To save you future correspondence about these problems, please make the following checks before returning your report:									
(1) Review the report carefully to see that no items are omitted for the year being covered. (2) Calculate and enter figures for the four "reasonableness" checks below, and review the results. (3) Correct your report for any errors you find and explain unusual figures in "Remarks." For most manufacturing establishments the figures computed usually fall within the ranges indicated.									
"Reasonableness" checks		Calculation required for each check				Figures for survey year		Usual range	
a. Average hourly wages per production worker	Item 3Ae (Production workers' wages) ÷ Item 4e (Total man-hours)					\$		\$1 - \$10	
b. Hours worked per week per production worker	Item 4e (Total man-hours) × 50 ÷ Item 2f (Average number of production workers)					Hrs.		20 - 60	
c. Salaries and wages per dollar of shipments	Item 3Ac (Total payroll) ÷ Item 9p (Total value of shipments)					¢		5¢ - 95¢	
d. Materials cost per dollar of shipments	Item 5f (Total materials cost) ÷ Item 9p (Total value of shipments)					¢		5¢ - 95¢	
e. Is the total for Value of Shipments (Item 9p) greater than the sum for Payroll (Item 3Ac) plus total Cost of Materials, etc. (Item 5f)? ☐ Yes ☐ No - Explain in "Remarks"									
f. Is the gross value of depreciable assets at end of year (Item 10c) minus total capital expenditures during year (Item 7d), within 5% of gross depreciable assets at the beginning of the survey year? ☐ Yes ☐ No - Explain in "Remarks"									
g. Is the total for Purchased Fuels (Item 12) equal to the figure reported for fuels consumed in Item 5c? ☐ Yes ☐ No - Explain in "Remarks"									
Remarks									
CERTIFICATION									
Name of person to contact if questions arise regarding this report				Address (Number, street, city, State, ZIP code)				Telephone	
								Area code Number Extension	
CERTIFICATION - This report is substantially accurate and has been prepared in accordance with instructions.									
Period covered				Signature of authorized person				Title	
From To								Date	

APPENDIX D
Original Record Layout for 1954-1964 Industrial Time Series Files (ITS-1)

FORM DC-31A 10-6-61		U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		PROGRAM INDUSTRIAL TIME SERIES DETAIL RECORD 1962-1964		PROGRAM SPONSOR		LANGUAGES	
DIGITAL COMPUTER RECORD LAYOUT		RUN		PREPARED BY		DATE		PAGE NO. 1/1	
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APPENDIX D (cont.)

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APPENDIX E

Original Record Layout for 1954-1964 *Industrial Time Series Finder File Prep* Files (ITS-2)

[illegible]

APPENDIX F

The 1954-1958 Annual Survey of Manufactures "Shuttle Form"

Form MA-100 (10-14-55)		U. S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		Form Approved: Budget Bureau No. 41-R1256.5					
ANNUAL SURVEY OF MANUFACTURES ESTABLISHMENT REPORT		CONFIDENTIAL - This report should be returned WITHIN 30 DAYS OF ITS RECEIPT . This report is authorized by Act of Congress (13 U.S.C. 181) which requires that you file a report. Your report is confidential and only sworn Census employees will have access to it. It cannot be used for purposes of taxation, investigation, or regulation.							
ITEM 1 FEDERAL SOCIAL SECURITY EMPLOYER IDENTIFICATION NUMBER (AS OF DECEMBER 31, 1955)	Enter identification number reported in Item 10 of Form 941, Employer's Quar- terly Federal Tax Return..... (If this number was changed, or if a change of ownership has occurred, please enter the new number(s) and related ownership information in Item 12.)		(Please correct any errors in this mail address) MA-100						
ITEM 2 PHYSICAL LOCATION OF FACTORY, PLANT, OR MILL (AS OF DECEMBER 31, 1955)	(Physical location may differ from mail address) Street and number _____ City or town _____ County _____ State _____ (If this location was changed, please enter the new location(s) in Item 12.)								
READ DETAILED INSTRUCTIONS			IMPORTANT: Enter ALL figures, except Item 4 (Employment), in THOUSANDS						
			1954	1955	1956	1957	1958		
ITEM 3 SALARIES AND WAGES PAID TO— (\$000)	a. Production workers b. All other employees c. TOTAL PAYROLL (a + b)								
ITEM 4 NUMBER OF EMPLOYEES	Production Workers during pay period ended nearest 15th of — a. March b. May c. August d. November e. SUM of lines a, b, c, and d f. Average number (Divide sum on line e by 4) g. All other employees, March 15th h. TOTAL (f + g)								
ITEM 5 PLANT MAN- HOURS OF PRODUCTION WORKERS, BY QUARTER (Thousands)	a. January through March b. April through June c. July through September d. October through December e. TOTAL PRODUCTION WORKER MAN-HOURS (Sum of a through d)								
ITEM 6 COST OF MATERIALS, FUELS, ELECTRIC ENERGY, CONTRACT WORK, ETC. (\$000)	a. Materials, parts, components, containers, supplies, etc., consumed b. Products bought and resold without further manufacture c. Fuels consumed d. Purchased electric energy e. Cost of contract work done for you by others on your materials f. TOTAL COST (Sum of a through e)								
ITEM 7 INVENTORIES OF THIS ESTABLISH- MENT AT END OF YEAR (\$000)	a. Finished products inventories b. Work-in-process inventories c. Materials, supplies, fuels, etc., inventories d. TOTAL INVENTORIES, END OF YEAR (a + b + c)								
ITEM 8 CAPITAL EXPENDITURES DURING YEAR (Exclude land) (\$000)	a. New structures and additions to plant b. New machinery and new equipment c. Used plant and used equipment acquired from others d. TOTAL EXPENDITURES (a + b + c)								
ITEM 9 QUANTITY OF ELECTRIC ENERGY USED (Thous. of KWH)	a. Purchased electric energy (thousands of KWH) b. Generated electric energy (gross less generating-station use) c. Electric energy sold or transferred to other plants								
ITEM 10 VALUE OF PRODUCTS SHIPPED AND OTHER RECEIPTS (\$000)	Products made in this establishment (Describe):	Product class code number (See list)	1954	1955	1956	1957	1958		
	a.								
	b.								
	c.								
	d.								
	e.								
	f.								
	g.								
	h.								
	i.								
	q. Value of shipments, if any, of additional products in Item 10, Supplement, on reverse side.								
	r. Resales of products without further manufacture	8800X							
	s. Receipts for work done for others on their materials Describe work: _____	9300X							
	t. Miscellaneous receipts (Repair work, installation of own products, sales of scrap, etc.) Describe: _____	9000X							
	u. TOTAL (Sum of a through i and q through t)	7700X							

Form MA-100 (10-14-55)

(Please continue and sign certification on reverse)

Comm-DC 17232 OVER

APPENDIX F (cont.)

ITEM 10 SUPPLEMENT	Additional products made in this establishment (Describe):	Product class code number (See list)	1954	1955	1956	1957	1958	
VALUE OF PRODUCTS SHIPPED (\$000) (Extra space for entries on Item 10)	j.							
	k.							
	l.							
	m.							
	n.							
	o.							
	p.							
	q. TOTAL VALUE OF SHIPMENTS OF ADDITIONAL PRODUCTS (Sum of j through p)							
REMARKS:								
ITEM 11	Give name of controlling company of this establishment, if DIFFERENT from mailing name shown on front of report:							
ITEM 12 STATUS OF OWNERSHIP OR OPERATION OF ESTABLISH- MENT SINCE DECEMBER 31, 1954.	Check box or enter date on only ONE line each year:			1955	1956	1957	1958	
	a. Operated solely by your company during the year.....			☐	☐	☐	☐	
	b. " Purchased by you on.....(Date).....							
	c. " Sold by you on.....(Date).....							
	d. Did not operate at any time during the year (but still owned by you).....			☐	☐	☐	☐	
	" Give name and address of former owner (if Line b is dated) or purchaser (if Line c is dated)			Give new Employer Identification Number(s) (See Item 1 on front)		Give new location(s) of factory, plant, or mill (See Item 2 on front)		
ITEM 13 CHECKS TO ASSURE A COMPLETE AND ACCURATE REPORT	The Census Bureau reviews your report for omissions, inconsistencies, and unusual ratios. To save you future correspondence about these problems, please make the following checks before returning your report: (1) Review the report carefully to see that no items are omitted for the year being covered. (2) Calculate the four "reasonableness" checks described below, entering the figures for each, and analyze your results. (3) Correct your report for any errors you find; explain unusual figures in "Remarks" section.							
	"Reasonableness" checks		Calculation required for each check		Resulting figures for the year			
					1955	1956	1957	1958
	(a) Average hourly wages per worker	Item 2a (Production worker wages) ÷ Item 5e (Total man-hours)	\$	\$	\$	\$		
	(b) Hours worked per year per worker	Item 5e (Total man-hours) ÷ Item 4f (Average production workers) X 1,000						
	(c) Salaries and wages per dollar of shipments	Item 3c (Total salaries and wages) ÷ Item 10u (Total value of shipments)	¢	¢	¢	¢	¢	
(d) Materials cost per dollar of shipments	Item 6f (Total materials cost) ÷ Item 10u (Total value of shipments)	¢	¢	¢	¢	¢		
ITEM 14	Name and address of person who should be contacted if questions arise regarding this report					Telephone No.		
ITEM 15 CERTIFICATION	This report is substantially accurate and covers the period from _____ to _____							
	(Date)		(Title)		(Signature of authorized person)			

APPENDIX G
The 1958-1963 Annual Survey of Manufactures “Shuttle Form”

Form MA-100 (9-20-59)		ANNUAL SURVEY OF MANUFACTURES ESTABLISHMENT REPORT		Form Approved; Budget Bureau No. 41-81256-8 U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS																																																																																																																																																																																																																																												
PLEASE NOTE - A. CONFIDENTIAL. This report is authorized by Act of Congress (13 U.S.C. 181). Your report is confidential and only sworn Census employees will have access to it. It can not be used for purposes of taxation, investigation, or regulation. B. The Census Bureau reviews your report for omissions, inconsistencies, and unusual ratios. Incomplete and inaccurate answers will result in correspondence which is both costly and time consuming. Be sure to COMPLETE EVERY ITEM. Enter "None" in items if appropriate. C. If book records are not available, reasonably accurate estimates for most items are acceptable for the statistical purposes of this survey. D. Please submit your report to the Bureau of the Census, Washington 25, D. C., within 30 days of its receipt. E. PLEASE READ INSTRUCTIONS BEFORE COMPLETING REPORT.		In correspondence pertaining to this report please refer to this file number _____ ITEM 1 - Name and address 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ (Please correct any errors in name and address)																																																																																																																																																																																																																																														
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APPENDIX G (cont.)

Form MA-100		ITEM 11		Product Class code number (See manual)		1958	1959	1960	1961	1962	1963
VALUE OF PRODUCTS SHIPPED (\$1000) (Supplement to Item 9)	Additional products of this establishment (Describe):	a.									
		b.									
		c.									
		d.									
		e. TOTAL (Transfer to Item 9 line h)									
ITEM 12 PHYSICAL LOCATION OF ESTABLISHMENT (FACTORY OR MILL); COMPANY ORGANIZATION, AND CHANGES IN OWNERSHIP OR OPERATION OF ESTABLISHMENT	a. Physical location of establishment at end of 1959 (may differ from mail address)		Street and number		City or town		County		State		
	Please check proper box and furnish information requested below for each year:										
	b. Did the physical location of the establishment change since 1958? If "Yes," please report the new location in Remarks. (If not reported in "a" above.)										
	c. Does the company that owns or controls the establishment covered by this report also own or control other manufacturing establishments?										
	d. If the answer to 12c was "No," did the company have any plants under construction but not yet in operation?										
	e. Changes in ownership or operation of this establishment during the year:										
	1. Purchased (Enter date, name and address of former owner in Remarks)										
	2. Sold (Enter date, name and address of purchaser in Remarks)										
	3. Went out of business (Specify date in Remarks)										
	4. Reorganized (Partnership change or change in corporate status)										
5. Started new business (No previous owner)											
6. Remained the same as in the previous year											
f. Federal Social Security Employer Identification Number - Enter identification number of this establishment (Item 10 of Employer's Quarterly Federal Tax Report, Treasury Form 941) for the last quarter of each year or for the last quarter filed if business was sold or discontinued during the year.											
1958		1959		1960		1961		1962		1963	
ITEM 13 CHECKS TO ASSURE A COMPLETE AND ACCURATE REPORT											
The Census Bureau reviews your report for omissions, inconsistencies, and unusual ratios. To save you future correspondence about these problems, please make the following checks before returning your report:											
(1) Review the report carefully to see that no items are omitted for the year being covered.											
(2) Calculate the four "reasonableness" checks described below, entering the figures for each, and review the results.											
(3) Correct your report for any errors you find; explain unusual figures in "Remarks" section.											
"Reasonableness" checks		Calculation required for each check		Resulting figures for the year—							
a. Average hourly wages per production worker		Item 3a (Production worker wages) ÷ Item 4e (Total man-hours)		1959	1960	1961	1962	1963			
b. Hours worked per year per production worker		Item 4e (Total man-hours) x 1000 ÷ Item 2f (Average number of production workers)		\$	\$	\$	\$	\$			
c. Salaries and wages per dollar of shipments		Item 3c (Total payroll) ÷ Item 9f (Total value of shipments)		Hrs.	Hrs.	Hrs.	Hrs.	Hrs.			
d. Materials cost per dollar of shipments		Item 5f (Total materials cost) ÷ Item 9f (Total value of shipments)		¢	¢	¢	¢	¢			
ITEM 14 REMARKS PERTAINING TO THE REPORT FOR THE SPECIFIED YEAR											
1959											
1960											
1961											
1962											
ITEM 15 PERSON TO CONTACT											
Name and address of person who should be contacted if questions arise regarding this report (Please revise when necessary)										Telephone No.	
ITEM 16 CERTIFICATION											
This report is substantially accurate and covers the 1959				Signature of authorized person				Title		Date	
From				To							
1960 period				1961 period				1962 period			
From				To				From		To	
Signature				Signature				Signature		Signature	
Date				Date				Date		Date	

APPENDIX H **The 1964 Annual Survey of Manufactures Form**

DUE DATE: 30 DAYS AFTER RECEIPT OF FORM		Budget Bureau No. 41-R-1256.15; Approval Expires December 31, 1969	
FORM MA-100 U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		NOTICE - Response to this inquiry is required by law (Title 13 U.S. Code). By the same law, your report to the Census Bureau is confidential. It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.	
ANNUAL SURVEY OF MANUFACTURES		TAB ☐ V ☐ XI ☐	CENSUS FILE NO. <input type="text"/>
PLEASE COMPLETE EVERY ITEM TO AVOID CORRESPONDENCE OR SURE TO READ INSTRUCTION MANUAL BEFORE COMPLETING REPORT		IND-C ☐ 2	
ITEM 1 - PHYSICAL LOCATION OF ESTABLISHMENT (Give actual location, not mailing address)		IND-T ☐ 3	
Address <input type="text"/>		AREA ☐ 4	
City <input type="text"/> County <input type="text"/> State <input type="text"/>		INFL ☐ 5	
		S ☐ 6	
		PPN ☐ 7	
		(Please correct if mailing address has changed)	
COMPLETE EVERY ITEM (Enter "0" when appropriate)		1963	1964
ITEM 2 - NUMBER OF EMPLOYEES	Number of production workers during pay period which includes the 12th of the month <input type="text"/>	e. March	1965
	e. Sum of lines c - d	b. May	1966
	f. AVERAGE NUMBER (Divide sum on line e by 4 - omit fractions and decimals)	c. August	
	g. All other employees during the pay period which includes the 12th of March	d. November	
	h. TOTAL NUMBER OF EMPLOYEES (Sum of lines f and g) <input type="text"/>		
IMPORTANT: Report items 3-9, and 11-12 in thousands (Example: if total payroll is \$215,166, enter \$215)			
ITEM 3 - PAYROLLS (\$000)	a. Production workers' wages		
	b. All other employees' salaries and wages		
	c. TOTAL PAYROLLS <input type="text"/>		
ITEM 4 - PLANT MAN-HOURS OF PRODUCTION WORKERS, BY QUARTER (\$00)	a. January through March		
	b. April through June		
	c. July through September		
	d. October through December		
	e. TOTAL PRODUCTION WORKERS' MAN-HOURS (Sum of lines a - d) <input type="text"/>		
ITEM 5 - COST OF MATERIALS, FUELS, ELECTRICITY, CONTRACT WORK (\$000)	a. Cost of materials, parts, components, containers, etc., consumed		
	b. Cost of products bought and resold as such		
	c. Cost of fuels consumed		
	d. Cost of purchased electricity		
	e. Cost of contract work done for you by others on your materials		
	f. TOTAL COST (Sum of lines a - e) <input type="text"/>		
ITEM 6 - INVENTORIES OF THIS ESTABLISHMENT AT END OF YEAR (\$000)	a. Finished products inventories		
	b. Work-in-process inventories		
	c. Materials, supplies, fuels, etc., inventories		
	d. TOTAL INVENTORIES, END OF YEAR (Sum of lines a - c) <input type="text"/>		
ITEM 7 - CAPITAL EXPENDITURES DURING YEAR (Exclude land) (\$000)	a. New structures and additions to this plant		
	b. New machinery and new equipment		
	c. Used plant and used equipment acquired from others		
	d. TOTAL CAPITAL EXPENDITURES (Sum of lines a - c) <input type="text"/>		
ITEM 8 - QUANTITY OF ELECTRICITY (Thousands of KWH)	a. Purchased electricity (for which cost is reported in 5d)		
	b. Generated electricity (gross less generating station use)		
	c. Electricity sold or transferred to other establishments		
ITEM 9 - VALUE OF PRODUCTS SHIPPED AND OTHER RECEIPTS (\$000)	Product classes of this establishment (If printed descriptions are not correct, please revise. Describe all additional products.)	Product class code (See manual) 5	1963
	a.		1964
	b.		1965
	c.		1966
	d.		
	e.		
	f.		
	g.		
	h. Insert total value of shipments reported in item 9A on reverse side.		
	i. Receipts for work or services performed by you for others on their materials (Describe)	93000	
	j. Miscellaneous receipts (Repair work, installation, sales of scrap, etc.) (Describe)	99980	
	k. Sales of products bought and resold without further manufacture, processing, or assembly. (Report cost in item 5b)	99989	
	l. TOTAL (Sum of values in lines a - k) <input type="text"/>	77000	
ITEM 10 - QUANTITY OF PRODUCTS SHIPPED (If additional lines are needed, use item 9A on reverse side.)	Report quantity for products listed in item 9 only if requested in manual. (Please enter description)	Unit of quantity	Product class code 6
	a.		1963
	b.		1964
	c.		1965
	d.		1966
ITEM 11 - GROSS BOOK VALUE OF FIXED ASSETS (As of end of year - original cost)	See instruction manual before completing		
	1. Buildings and other structures (exclude land)		
	2. Machinery and equipment (Include production, office, transportation equipment)		
	3. TOTAL GROSS BOOK VALUE OF FIXED ASSETS (Sum of lines 1 and 2) <input type="text"/>		
ITEM 12 - RENTAL PAYMENTS (or equivalent) (\$000)	1. For use of buildings and structures (exclude payment for land)		
	2. For use of transportation, production, and office equipment by this establishment.		

APPENDIX H (cont.)

ITEM 9A - VALUE OF PRODUCTS SHIPPED AND OTHER RECEIPTS (\$000) (Continued from Item 9)	Additional product classes of this establishment (Describe)		Product class code (See manual) 5	1963	1964	1965	1966			
	a. _____									
	b. _____									
	c. _____									
	d. _____									
	e. TOTAL (Transfer to item 9, line h) →									
ITEM 12 - SUPPLEMEN- TAL LABOR COSTS NOT INCLUDED IN PAYROLLS (Item 3c) (\$000)	See instruction manual for details						1965	1966		
	a. Legally required expenditures									
ITEM 13 - FEDERAL SOCIAL SECURITY IDENTIFICA- TION NUMBER AND CHANGE IN PHYSICAL LOCATION OF ESTABLISH- MENT (FACTORY OR MILL); COMPANY ORGANIZA- TION; AND CHANGES IN OWNERSHIP OR OPERATION OF ESTABLISH- MENT	FEDERAL SOCIAL SECURITY IDENTIFICATION NUMBER AS SHOWN ON EMPLOYER'S QUARTERLY FEDERAL TAX RETURN, TREASURY FORM 941. The Census Bureau uses this number to control mailing and receipt of report forms. To avoid receiving duplicate report forms, please report any change in this number since January 1, 1963.									
	1963		1964		1965		1966			
	☐ Unchanged		☐ Unchanged		☐ Unchanged		☐ Unchanged			
	☐ New: _____		☐ New: _____		☐ New: _____		☐ New: _____			
	Please check the appropriate box.									
	a. Did the physical location of the establishment change since 1963? (If "Yes," please report the new location in item 15)		Yes		No		Yes		No	
	b. 1. Does the company operate more than one manufacturing location?		Yes		No		Yes		No	
	2. Did the company have any plants under construction but not yet in operation?		Yes		No		Yes		No	
	c. Changes in ownership or operation of this establishment since 1963?		Yes		No		Yes		No	
	1. Purchased (Enter date, name, and address of former owner in item 15)		Yes		No		Yes		No	
2. Sold (Enter date, name, and address of purchaser in item 15)		Yes		No		Yes		No		
3. Discontinued operations (Specify date in item 15)		Yes		No		Yes		No		
☐ Plant dismantled, destroyed, abandoned ☐ Inactive or idle		Yes		No		Yes		No		
4. Reorganized (Describe in item 15, e.g., partnership change or change in corporate status)		Yes		No		Yes		No		
5. Started new business (no previous owner)		Yes		No		Yes		No		
6. Remained the same as in 1963		Yes		No		Yes		No		
ITEM 14 - CHECKS TO ASSURE A COMPLETE AND ACCURATE REPORT	The Census Bureau reviews your report for omissions, inconsistencies, and unusual ratios. To save you future correspondence about these problems, please make the following checks before returning your report:									
	(a) Review the report carefully to see that no items are omitted for the year being covered.									
	(b) Calculate the four "reasonableness" checks described below, entering the figures for each, and review the results.									
	(c) Correct your report for any errors you find; explain unusual figures in item 15.									
	"Reasonableness" checks		Calculation required for each check			Resulting figures for the year --				
						1965		1966		
	1. Average hourly wages per production worker	Item 3a (Production workers' wages) ÷ Item 4a (Total man-hours)	\$		\$					
	2. Hours worked per year per production worker	Item 4a (Total man-hours) × 1000 ÷ Item 2f (Average number of production workers)	Hrs.		Hrs.					
	3. Salaries and wages per dollar of shipments	Item 3c (Total payroll) ÷ Item 9f (Total value of shipments)	¢		¢					
	4. Materials cost per dollar of shipments	Item 5f (Total materials cost) ÷ Item 9f (Total value of shipments)	¢		¢					
5. Is the total for value of shipments (item 9f) greater than the sum for payroll (item 3c) plus total cost of materials, etc., (item 5f)? ☐ Yes ☐ No (If "No," please explain in item 15)										
ITEM 15 - REMARKS PERTAINING TO THE REPORT FOR THE SPECIFIED YEAR	1965									
	1966									
ITEM 16 - CERTIFICA- TION	Name of person to contact if questions arise regarding this report		Address (Revise when necessary)				Telephone (incl. area code, no., ext.)			
	CERTIFICATION - This report is substantially accurate and has been prepared in accordance with instructions.									
	Period covered		Signature of authorized person		Title		Date			
	1965 →	From To								
1966 →	From To									

APPENDIX I
Census of Manufactures Supplementary Inquiries for 1957 (Form MC-D11)

CONFIDENTIAL - This report is required by Act of Congress (13 U.S.C. 131, 193, and 224). Your report is confidential and only sworn Census employees will have access to it. It cannot be used for purposes of taxation, investigation or regulation.		FORM APPROVED BUDGET BUREAU NO. 41-58105	
FORM MC-D11 (4-4-56)		(Please correct any errors in name and address)	
U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS			
CENSUS OF MANUFACTURES SUPPLEMENTARY INQUIRIES FOR 1957			
NOTE: Return in thirty (30) days to: Bureau of the Census, Washington 25, D.C. Please read instructions carefully before completing your report. Complete a report for each manufacturing establishment of this company.			

Item 1 - INFORMATION REQUESTED FROM 1957 ANNUAL SURVEY OF MANUFACTURES REPORT	Copy the information requested below from your Form MA-100, Annual Survey of Manufactures, for this establishment:	AMOUNT <i>(Thous. of dollars)</i>
	A. Total payroll in 1957 (Item 3, line C)	\$
	B. Total cost of materials, fuels, etc., in 1957 (Item 6f)	\$
	C. Total value of shipments in 1957 (Item 10, line U)	\$
	D. Enter Federal Social Security Employer Identification Number. (Enter number as reported on Form 941, Item 10, on latest employer's quarterly tax return under Federal Insurance Contributions Act).....	
	(Enter 9 digits)	

Item 2 - EXPENDITURES IN 1957 FOR MAINTENANCE AND REPAIRS ON STRUCTURES, GROUNDS, AND EQUIPMENT AT THIS ESTABLISHMENT	(In reporting this item follow the normal accounting practices of your industry. The item should include the costs charged to current expense accounts, such as cleaning, repair of office equipment and plant machinery, painting, repair of structures, maintenance of grounds, etc. It should exclude expenditures which are charged to a capital account or to a depreciation reserve. Include expenditures made by your company on leased property or facilities owned by a Government agency. If your book records do not provide the detail requested in lines (1) and (2), carefully prepared estimates will be accepted.)	AMOUNT <i>(Thous. of dollars)</i>
	A. Total expenditures for maintenance and repairs - (Include your own expenditures for repair materials and supplies, salaries and wages, and the cost of work done by outside contractors (sum of (1) and (2)).	\$
	(1) Salaries and wages paid to own employees for maintenance and repair activities.	\$
	(2) Other maintenance and repair costs (include purchased materials and supplies used in maintenance and repairs and maintenance and repair services purchased from other business establishments).	\$

Item 3 - REPORTING OF MAINTENANCE AND REPAIR COSTS IN 1957 ANNUAL SURVEY	A. In your report for 1957 on Form MA-100 (Annual Survey of Manufactures) did you include in Item 6A, Cost of materials, parts, supplies, etc., the materials and supplies purchased for use in maintenance and repairs?	YES	NO
	B. In your report for 1957 in Item 6 of Form MA-100:		
	(1) Did you include the cost of maintenance and repair services purchased from other business establishments in Item 6A (Cost of materials, parts, etc.)?		
	(2) Did you include the cost of maintenance and repair services purchased from other business establishments in Item 6E (Cost of contract work done for you by others on your materials)?		

USC OMM-DC 23584

APPENDIX I (cont.)

Item 4 - SELECTED SUPPLE- MENTARY EMPLOYEE COSTS IN 1957	A. Employer payments for legally required employee insurance plans:		AMOUNT (Thous. of dollars)	EINS_OAS157	
	(1) Old age and survivors insurance		\$	EINS_UI57	
	(2) Unemployment insurance - State and Federal		\$	EINS_WC57	
	(3) Workmen's compensation premiums; and State temporary disability payments (applies in Rhode Island, California, New York, and New Jersey).		\$		
	B. Employer payments or allocations for private pension plans, health and welfare plans, life insurance, stock purchase plans, thrift or savings plans, and supplemental unemployment compensation plans (See instructions below)		\$	EINS_PRIVATE57	
	<p>Include in "B" employer payments (a) of insurance premiums on hospital and medical plans, (b) of life insurance premiums, and (c) of premiums on supplementary accident and sickness insurance. In reporting payments for insurance report net payments, i.e. gross payments less any offsetting dividends, refunds, or other reductions in premiums.</p> <p>Include in Item 4B also, employer payments or allocations: (a) on all pension plans regardless of method of administration, (b) on supplemental unemployment compensation plans, (c) on welfare plans, (d) on stock purchase plans in which the employer payment is not subject to withholding tax, and (e) on deferred profit sharing plans.</p> <p>The items listed in the paragraph above are generally considered as deferred rather than current income to employees and are not subject to withholding of income tax. If the payments or allocations by the company are made to a fund, payments to employees out of these funds should not be reported. However, payments made directly to retired employees or their survivors that do not pass through a fund should be included in Item 4B.</p> <p>Exclude from B any other expenditures not of the type listed above including losses on company operated cafeterias and snack bars, cost of in-plant medical services, cost of free parking lots, discounts on employee purchases, cost of uniforms and other work clothing supplied to employees, and similar expenditures. Exclude also income earned by the funds noted above and exclude employee contributions to the plans listed above.</p> <p>Exclude from B payments which should be reported as wages and salaries in the Annual Survey of Manufactures, such as payments for holidays, vacations, sick pay, bonuses, unused vacation, jury pay, night shift bonus, suggestion awards, and the payment on profit sharing and special stock purchase plans which are subject to withholding tax. (See the Annual Survey of Manufactures instructions on salaries and wages.)</p> <p>If any of the items included in line B are maintained in your records only at the company level, allocate to the manufacturing establishments. In such cases, distribute the total on the basis of the ratio of the payroll of each manufacturing establishment to the total company payroll unless you have developed your own method of making such allocations. Specify the method used and the approximate portion of item 4B that has been allocated on an attached sheet.</p>			AMOUNT (Thous. of dollars)	
	Item 5 - INSURANCE IN 1957		Insurance premiums accrued or paid to others in 1957 (report on accrual basis if your records are maintained this way; if not, report on cash basis)	\$	INS57
			Exclude premiums for workmen's compensation, hospitalization plans, life insurance and other insurance reported in Item 4, and exclude charges into company operated self insurance funds. Report all other insurance charges not included in Item 4 such as insurance on structures, equipment, and inventories; liability insurance; theft insurance; and window breakage; etc.		
	Item 6 - RENT IN 1957		Rental payments to others in 1957 (include payments for structures and equipment)	\$	RENT57
Item 7 - TAXES IN 1957		Tax payments (or charges) in 1957 on land, structures, equipment, and inventories Exclude all other taxes such as income taxes, sales taxes, excise taxes, and permit fees.	\$	TAX57	
Item 8 - DEPRECI- ABLE (OR DEPLET- ABLE) ASSETS OF THIS ES- TABLISH- MENT	A. Gross book value of structures, equipment, and other or depreciable or depletable fixed assets on December 31, 1957 owned by you		\$	ASSETS57	
	B. Accumulated depreciation and depletion to December 31, 1956		\$	CUMDEP57	
	C. Depreciation and depletion charged in 1957		\$	DEP57	
	D. Retirements in 1957 (undepreciated value of fixed assets retired from use)		\$	RET57	
	If your records on depreciation at the company level and at the establishment level differ (for example, declining balance method at the company level and straight line for the establishment) you should report on the basis of the records maintained at the establishment.				
Item 9 - CERTIFI- CATION	Name of person to be contacted if questions arise regarding this report		Telephone No.		
	Information supplied by - Name of company	Signature of authorized official			
	Address of company	Title			

APPENDIX J
Original Record Layout for 1954-1961 Industrial Time Series 25-Industry "Prototype" Files

U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS										PROGRAM 25 Industry Time Series										PROGRAM SPONSOR Industry Division										LANGUAGE:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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I/P										Etab. identification number ID										Ind.										Area										WIP FPI end of 1953										Cost of fuels + elect. 1961										Horse-power 1954										MC-DII data for 1957										Ins. + taxes										Gross value assets										Accum dep to 12/31/56										Dep in 57										Ret in 57										Flags										Flags										Seq.										1 Birth year										2 Death year										3 Value added flag										4 = no neg AV										5 = neg AV > 1										6 = neg AV > 1										7 = all neg AV										8 First 3 yrs c										9 new plant										10 = neg AV in fir										11 yrs of new										12 plant and i										13 one or more										14 later year										15 = 1/2 CE ≤ GBV										16 = >										17 = Dep ≤ GBV										18 = >										19 = Reported										20 = Estimated										21 = Partially estimated										22 Specialization										23 code First digit is										24 primary product										25 in 1958. Second di										26 is the percent spec										27 in this product										28 class in this year																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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I/P										ID										254										Prod worker wages a										Total payroll b										Prod workers no. c										All emp. no. d										Peak quarter man. hours e										Total man. hours f										Cost of materials g										WIP FPI h										New struct. i										Total cap. expend. j										Total value of shipments k										Adj. value added l										Cost mat. + payroll m										Seq.										1 = no neg AV										2 = neg AV > 1										3 = neg AV > 1										4 = all neg AV										5 First 3 yrs c										6 new plant										7 = neg AV in fir										8 yrs of new										9 plant and i										10 one or more										11 later year										12 = 1/2 CE ≤ GBV										13 = >										14 = Dep ≤ GBV										15 = >										16 = Reported										17 = Estimated										18 = Partially estimated										19 Specialization										20 code First digit is										21 primary product										22 in 1958. Second di										23 is the percent spec										24 in this product										25 class in this year																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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APPENDIX J (cont.)

FORM BC31f (7-24-61)		U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		PROGRAM 25 Industry Time Series		PROGRAM SPONSOR Industry Division		LANGUAGE BINARY - FLEX - BCD X8 -																						
DIGITAL COMPUTER RECORD LAYOUT				RUN TSSE		PREPARED BY Katz		DATE 8/11/67																						
						PAGE NO. 272		FIELD# Field 9																						
1	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	REMARKS									
I/P	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9											
O/P	x	ID	259	1959	a	b	c	d	e	f	g	h	i	j	k	l	m		x	Seq.										
LANG.																														
2	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9										
I/P	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9											
O/P	x	ID	260	1960	a	b	c	d	e	f	g	h	i	j	k	l	m		x	Seq.										
LANG.																														
3	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9										
I/P	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9											
O/P	x	ID	261	1961	a	b	c	d	e	f	g	h	i	j	k	l	m		x	Seq.										
LANG.																														
4	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9										
I/P	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9											
O/P	x	ID	39900	Product class data for 1961										See Attachment A for format - varies by industry										Supp costs 57 SC	SC + CMS7 + SwS7	57 54 CE	57 54 CE	68VA	x	Seq.
LANG.																														
5	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9										
I/P	NOTE: Sequence is Industry by Identification Number. At the end of each industry																													
O/P	there is a 20 word record with ID=9999999999.																													
LANG.																														
6	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9										
I/P	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9											
O/P																														
LANG.																														

APPENDIX J (cont.)

Attachment A

FORM BC-31A (7-64-81)		U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		PROGRAM 25 Industry Time Series		PROGRAM SPONSOR Industry Division		LANGUAGE BINARY - B FLEX - F SEC 33 - NC CC				
Industry code		DIGITAL COMPUTER RECORD LAYOUT		RUN FIRSTA, WEND, and TSS4E		PREPARED BY Katz		DATE 8/16/67				
						PAGE NO. 1		REMARKS Fieldat				
1	2092	20921	20922	20920	C1	V1	C2	V2	C3	V3	C4	V4
	2271	22711	22712	22720	C1	V1	C2	V2	C3	V3	C4	V4
	2272	22720	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	2822	28220	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	2823	28231	28232	28241	28242	C1	V1	C2	V2	C3	V3	V3
2	2824	28241	28242	28231	28232	C1	V1	C2	V2	C3	V3	V3
	2911	29111	29112	29113	29114	29115	29116	29117	29118	29119	29110	99989
	3011	30111	30112	30113	30114	30115	C1	V1	C2	V2	C3	V3
	3241	32410	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	3312	33121	33122	33123	33124	33125	33126	33127	33128	33129	33120	
	3313	33130	C1	V1	C2	V2	C3	V3	C4	V4		
	3315	33151	33152	33155	33156	33157	33159	C1	V1	C2	V2	
3	3322	33220	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	3323	33230	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	3331	33311	33312	33319	C1	V1	C2	V2	C3	V3	C4	V4
	3332	33321	33323	33329	C1	V1	C2	V2	C3	V3	C4	V4
	3333	33331	33334	C1	V1	C2	V2	C3	V3	C4	V4	
	3334	33341	33342	C1	V1	C2	V2	C3	V3	C4	V4	
4	3351	33511	33512	C1	V1	C2	V2	C3	V3	C4	V4	
	3352	33520	33521	33522	33523	33524	33525	33526	C1	V1	C2	V2
	3362	33620	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	3391	33911	33919	C1	V1	C2	V2	C3	V3	C4	V4	
	3392	33920	C1	V1	C2	V2	C3	V3	C4	V4	C5	V5
	3519	35191	35192	35193	35195	35196	35197	C1	V1	C2	V2	
	3612	36121	36122	36123	C1	V1	C2	V2	C3	V3	C4	V4
5	Where a 5-digit code is shown, the data field contains the 1961 value of shipments for that product class. C1 is the product class code (5-digits) of the largest secondary product class for the establishment in 1961; C2 is the next largest, etc. V1 is the value of shipments corresponding to code C1; V2 is the value of shipments of code C2, etc. a field with no entry is blank.											
6												

Source: U.S. Bureau of the Census, Data Storage Action Request, Register Number 79-120, April 11, 1979.

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